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THE DEVELOPMENT OF COMMERCIAL SUGAR CANE AGRICULTURE IN
TRINIDAD TO 1938

by



RALPH VICTOR ALLEN SAMMY

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

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The undersigned certify that they have read, and recommended to the Faculty of Graduate Studies for acceptance, a thesis entitled THE DEVELOPMENT OF COMMERCIAL SUGAR CANE AGRICULTURE IN TRINIDAD TO 1938, submitted by RALPH VICTOR ALLEN SAMMY in partial fulfilment of the requirements for the degree of Master of Arts.

ABSTRACT

Sugar cane agriculture, from its inception in Trinidad, spread through three main stages of development. Prior to 1797, the island was governed by Spain, and the settlers in Trinidad were few, surviving mainly on subsistence farming. Some sugar export did develop in the late period of Spanish settlement and cane was grown only in the areas of settlement. These areas were far from being the most suitable for the requirements of sugar cane.

With the acquisition of the island by the British in 1797, the Motherland encouraged the spread of commercial cane cultivation in an effort to ensure a steady and continued supply of sugar to Britain. Great agricultural expansion resulted in Trinidad and cane continued to be grown in areas and under conditions unfavourable to its efficient production.

Trinidad's cane sugar faced great competition from European beet producers, especially in the latter half of the nineteenth century. It is shown that international politics determined to a great extent, the fluctuating fortunes of the Trinidad cane proprietor and the role of the crop in the economy of the island up to 1938.

A shortage of labour resulting from slave emancipation in the early nineteenth century, forced proprietors to grow canes in areas best suited to its cultivation, and it is in these areas that the crop is efficiently produced today.

ACKNOWLEDGEMENTS

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CHAPTER ONE

INTRODUCTION AND THE PHYSICAL ENVIRONMENT

Christopher Columbus was the first European credited with sighting Trinidad in 1492. From 1492 to 1797 the island remained a Spanish colony, poorly developed and existing solely for the benefit of the Spanish monarchy. The great mineral riches of Mexico and South America served as greater attractions for the Spanish Government, and the unimportant island of Trinidad languished under poor administration and neglect.

Trinidad's use to her Spanish owner was simply that of a refuelling station, and whatever agriculture did develop was simply left to chance or necessity for survival. The island's inhabitants were at first interested only in subsistence farming, and the introduction of sugar cane to Trinidad in 1542 was as a subsistence crop whereby residents could make their own sugar and rum. With an increasing world demand for sugar in the 18th century, the Spanish inhabitants began to export sugar in small quantities and from 1783 sugar cane became the greatest agricultural pre-occupation of the people. By 1787 it was the leading export crop of the island and maintained this importance until the early 20th century.

In 1797, Trinidad was captured by the British and remained a British colony for 165 years before gaining its independence in 1962. From the outset of British occupation, the latter found it profitable to continue the cultivation of sugar cane, and the history of Trinidad in the 19th century was largely the history of sugar. Sugar cane is essentially a tropical crop and Britain had to protect her tropical cane growing colonies in order to ensure a steady and uninterrupted supply of sugar to the United Kingdom. The continued growth of sugar cane became a political necessity in Britain's increased competition with her European rivals, and Trinidad's fortunes fluctuated with the fortunes and policies of the Mother Country.

The canes were at first grown on the western part of the island along the southern foothills of the Northern Range. It was not the best area for sugar cane growth but residents were still anxious to cling together for protection, so that estates were near the areas of consolidated settlement. With the consolidation of the English on the island by the mid-18th century, sugar cane cultivation spread to the better suited cane growing areas of South west and Central Trinidad, and these areas remain firmly established as cane areas today. These southwest and central areas of the island are gently undulating and well drained, unlike the original northern areas of sugar cane cultivation. Transportation of canes to the mills and of refined sugar to the export ports became easier and it was possible to plant extensive areas in cane without

the interruptions of settlements or swamps.

Scientific research into cane varieties and their adaptation to the physical environment were not made until the 1880's when cane sugar faced stiff competition from beet sugar on the world market. Cane sugar had not improved in quality for over fifty years and the markets abroad were demanding a better grade sugar. European beet sugar which was bounty fed into Britain, was not only cleaner but cheaper, and the various political schemes which permitted beet sugar to be fed into Britain in the latter half of the 19th century, affected Trinidad. These schemes are discussed later.

Because of the better beet sugar, the demand for Trinidad's sugar lessened, and in 1897 the island was faced with its first national economic crisis. Because of the relief offered by the Canadian market, sugar cane was allowed to survive but the loss of this market in 1930 again brought about a crisis. These developments are discussed in the subsequent sections of the study.

Nature and Requirements of the Sugar Cane

The sugar cane plant, from its germination to maturity demands certain requirements for growth. These involve conditions of temperature, precipitation, soil and water relations, cloudiness and sunshine, and certain cultivation requirements.

Climate:

Temperature

Of the climatic factors governing germination of the

sugar cane, temperature is one of the most important.¹ For proper germination temperatures must be between 70 - 110 degrees Fahrenheit. For continued growth under insular tropical conditions, where the fluctuations in temperature are small, temperature is rarely a limiting factor. As a result, adverse temperature conditions are never experienced in Trinidad. Water absorption is determined not only by the texture of the soil but also air and soil temperatures. Van Dillewijn points out however, that these conditions become critical in sub-tropical conditions where temperatures fall below 70 degrees F. Since Trinidad's temperatures rarely fall below 70 degrees F. at any time of the year, conditions of growth are not affected by Trinidad's climatic conditions.

Precipitation.

Of the total amount of water consumed by the cane plant, only 1% of the total amount is retained by the plant.² The large quantities of water used in excess of the amounts required for the building processes are lost by evaporation and transpiration. The excess of water lost through transpiration is not useless however, since transpiration fulfills the definite task of maintaining leaf temperatures, aids in the adsorption of nutrients within the plant, and is also involved in many other vital processes.

¹Van Dillewijn - Botany of Sugar Cane, Mass: Chronica Botanica Co., 1952, p. 71.

²Ibid., p. 270.

Maxwell³ has found that the rate of transpiration starts at a very low level shortly after planting of the canes and subsequently increases until a maximum is attained at an age of approximately six months. Since transpiration is important in maintaining leaf temperatures, the coincidence of the wet season in Trinidad with middle age of the plant, tends to counter balance each other so that the cane plant does not suffer from leaf water deficiencies at the maximum period of growth. This is due to the adjustment of the planting month to the climatic regions on the island.

The behaviour of sugar cane with its ability to absorb moisture through the leaves, and pass it through to the roots, differs from the behaviour of most other leaf crops. Evidence as to the exact nature of this process has not been substantially clarified, but sugar cane planters have long been aware of the beneficial effect of heavy dewfall and light showers, even if these are too small to moisten the soil.

However, transpiration is subject to variations in the course of the day. Generally it may be stated that on a bright day the absorption ratio starts to increase about one hour after sunrise, reaches a maximum after mid-day (2-3 p.m.) and decreases during the afternoon and night until a minimum is attained in the early morning hours. On a rainy day there is hardly any variation and the absorption rate does not surpass

³Maxwell, W., "Evaporation and Plant Transpiration", Journal Amer. Chem. Soc. See V 20, p. 469-483, 1898. Quoted from Van Dillewijn.

that during night. On cloudy days the daily trend resembles that on bright days but the maximum is markedly depressed. However, daily fluctuations are the result of variations in external factors of which light intensity, air humidity and temperature are dominant. Reference to transpiration here is related to the fact that the evapotranspiration stream is subject to both climatic and physiological factors. Consequently, the rate of evapotranspiration in plants may also be taken as a measure of growth rate of the plant.

Van Dillewijn states that the extent to which sugar cane is able to keep absorption and transpiration in balance governs its degree of drought resistance. This is one of the characteristics that geneticists have now bred into cane plant varieties. An excessive intake of water is no problem since the plant gets rid of the excess by transpiration and exudation. The harvesting of sugar cane in Trinidad usually commences on January 1st of each year which means that the plant is left with one month of conditions bordering on drought, after the second maximum of precipitation in November. The cane farmer is not faced with the problem of drought in Trinidad, except in the initial stages of the crop's growth. Drought is partly offset by afternoon and evening showers as well as a relative humidity of 60% in the dry season. Again drought is a relatively short period of one month since mid-April showers usher in the wet season and adequate rainfall for the period of growth.

Kamerling⁴ has found that different varieties of sugar cane require different quantities of water for their growth and development. As will be pointed out later in this study, certain varieties do not adapt well to conditions of poor drainage whereas other varieties will adapt well to these conditions. Correlating conditions of temperature, cloudiness and sunshine and so on are also important in determining cane variety adaption.

Cloudiness and Sunshine

The effect of light intensity on cane growth is greatly influenced by temperatures.⁵ In general, it has been found that the health of cane plants improved and growth increased with an increase of light intensity at higher temperatures. In addition to light intensity, day length plays an important role in determining the amount of sunshine available to the plant. In Trinidad actual sunshine averages 6-7 hours daily. Precipitation on the western part or sugar cane growing zone of the island is chiefly in the late afternoon. The cane plant is thus exposed to at least six hours of continuous sunlight daily, producing thicker and shorter plants, with broader and greener leaves. Plants that are grown in areas of lower light intensity are thinner and have a lower moisture content than those grown in sunnier conditions.

Carbon assimilation is largely determined by the at-

⁴Kamerling, Z - De watervverzorging van de rietplant, Handel 4 de Suikercongr, Semarang, 1900. p. 14-44. Quoted from Van Dillewijn, p. 285.

⁵Van Dillewijn, op. cit., p. 122.

mospheric conditions of light intensity and temperature. Singh and Lal⁶ found that the carbon dioxide concentration of the air in sugar cane fields exhibits a diurnal variation with a minimum during the afternoon and a maximum during the second half of the night. This corresponds closely with the Trinidad pattern of afternoon showers which decreases the carbon content in wet conditions, followed by clear night time conditions on the western coast of the island. The tendency for wind speeds to fall at night could also lead to the concentration of carbon dioxide within the fields at this time.

Cane Size and Sucrose Content

The conditions of size and sucrose content of the sugar cane are the result of many factors. Growth involves not only elongation of the plant but includes an increase in dry matter as well as size and weight. The growth of the cane plant as well as its constituent parts does not proceed at a uniform rate.⁷ Development starts very slowly in the germinating bud and it increases gradually till a maximum is reached which is followed by a gradual decrease. Cane size and sucrose content depend to a large extent on the variety of cane planted. Varieties and their suitability to the Trinidad environment are discussed later in the text.

⁶Singh, B.N. and Lal, K.N. - "Limitation of Blackman's Laws of Limiting Factors and Harder's Concept of Relative Minimum as Applied to Photosynthesis" Plant Phys., V. 10, p. 245-265.

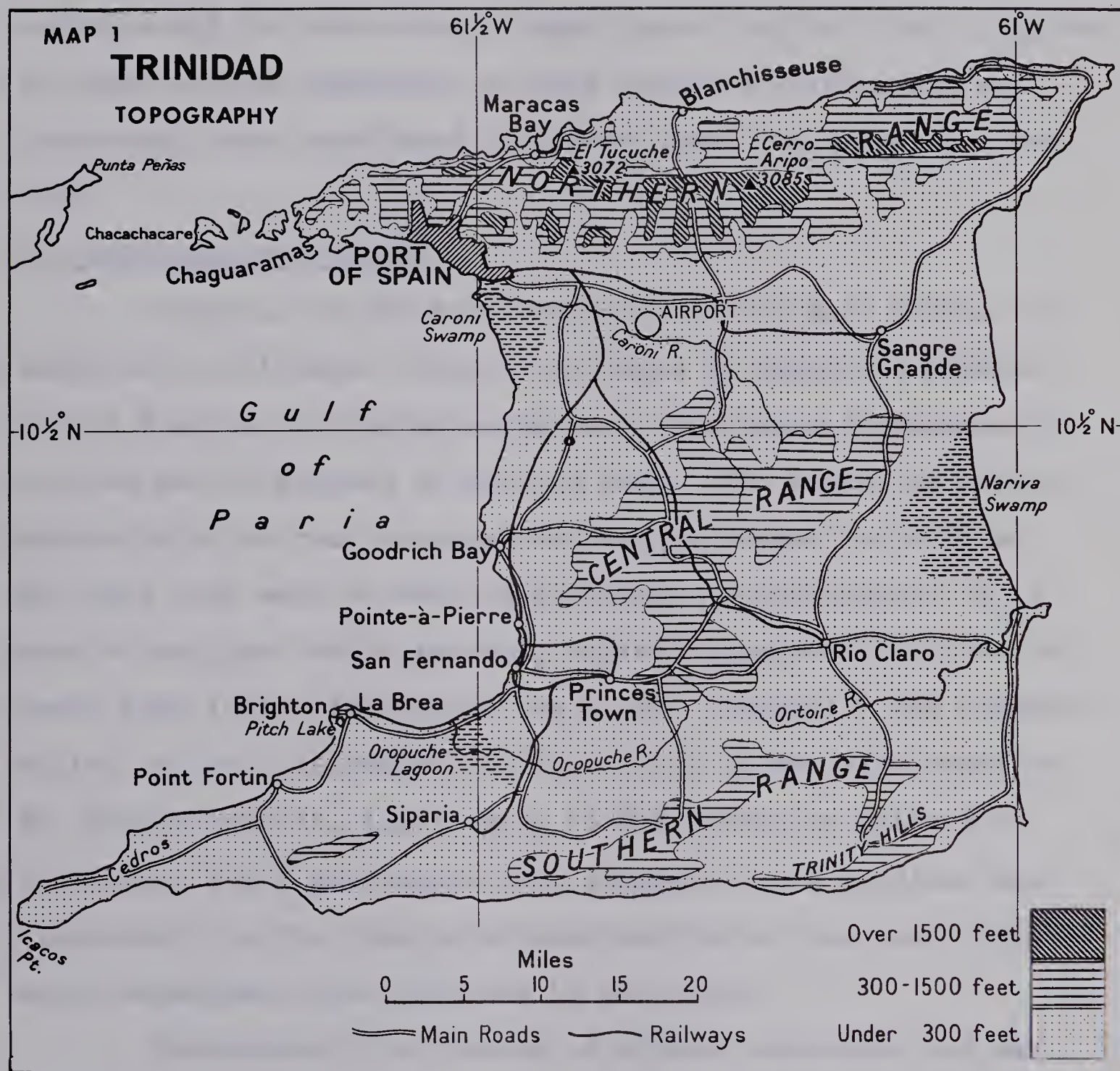
⁷Van Dillewijn, op. cit., p. 97.

Cane Cultivation Requirements

The planting of sugar cane is dependent on the climatic factors characterised by the wet and dry seasons and the period required for growth. Cultivation methods are determined further by soil type and variety, while transportation is largely a matter of organisation and the relief of the land.

The early cultivation of cane in Trinidad was historically a case of trial and error. It was not until successful experiments were started in Barbados in the 1880's that Trinidad planters found it worthwhile to improve their varieties. The abolition of slavery and the preferential sugar tariffs, as well as stern competition from European beet sugar also forced the planters to improve their varieties, yields, and field techniques.

The spread of sugar cane over the various areas of the island is discussed later, showing the role of water relations on sugar cane varietal adaptability. Cultivation methods and resulting cane quality and yields are discussed in the historical body of the study. Since Bourbon cane predominated to around 1910 before other varieties were introduced, this aspect of the study is left for discussion to the period in question. It will be shown in later chapters that little progress was made in the field and the factory, until the influence of European bounty fed beet on the English market, stimulated the British West Indies planters' desire to amend their defects in cultivation and technology.



Trinidad's physical conditions for the growth of sugar cane were very adequate as will be shown, but the planters' greed for quick profits, and their ability to spread cultivation continuously to surrounding virgin lands, led to little progress in cane varietal research, so that improved cultivation and technology were sacrificed for profit until the late 19th century.

THE TRINIDAD ENVIRONMENT

Trinidad is the most southerly of the West Indian islands and is situated between latitudes 10 degrees 3 minutes and 10 degrees 50 minutes north, and longitudes 60 degrees 54 minutes and 61 degrees 56 minutes west. The island is 1,754.5 square miles and the average north-south length is 48 miles and that from east to west is 35 miles. Geologically, it is part of mainland South America, unlike the majority of the volcanic West Indian islands to the north. Generally the island's relief is low, culminating at 3,000 feet in the high peaks of Mt. Tucuche and Mt. Aripo. Much of the island is below 500 feet (Map 1) and geologists have suggested that Trinidad was separated from the Venezuelan mainland during the last deglaciation consequent upon the rise in sea level.

Structurally the island is aligned east-west and may be divided into five physiographic regions:

- (1) The Northern Range
- (2) The Northern Lowlands
- (3) The Central Range
- (4) The Southern Lowlands

(5) The Southern Range.

(1) The Northern Range has an average elevation of 2000 feet and is the most marked structural feature of the island. Overfolding, strike-faulting, metamorphism and igneous activity have made the area geologically complex. It is composed of quartzites, schists and limestone of Pre-Cretaceous age. The slopes of this range vary from steep to precipitous. The north-south flowing rivers following the direction of the strike-faulting often develop an east-west pattern at their headstreams which are in less resistant rock types. Where tributaries join the larger streams, basins are formed offering the only habitable areas of the range. These basins with their enclosing sides were the sites of the island's earliest estates. From these basins, however, transportation to the export ports proved difficult and these basins were soon abandoned agriculturally.

(2) The Northern Lowland is the largest of the physiographic units and was the first area of widespread European settlement and sugar cane cultivation. It is composed of Upper Miocene and Quaternary deposits of sands and clays with alluvial terraces of Pleistocene age in the north.

The Plain is drained by two major streams, the west flowing Caroni which enters the Gulf-of-Paria through swampland immediately south of Port-of-Spain and the east flowing North Oropuche River. The elevation between the water parting of these two rivers is only 150 feet and the maximum elevation of

the higher alluvial deposits on the margins of the Plain reaches a height of only 200 feet. The continuous deposition of material on the alluvial fans of the more steeply graded tributaries of the Northern Range have succeeded in pushing the main stream southwards.

Because of the low relief, the west flowing Caroni river meanders and mangrove swamps extend many miles inland from the rivers mouth. These swamps are former salt water lagoons and contain mangroves which help to solidify the spit shoreline.

The south west corner of the Plain is not a part of the Caroni Basin but rather a zone of gently rolling hills drained by north west flowing rivers. These rivers have their head-streams in the Central range and this area together with the Southern Lowland can be considered to be a gently undulating peneplain.

(3) The Central Range is composed of Tertiary hills of low relief but the geology of the area is complex and inadequately known. Structurally the region is a monocline with northward dipping strata. Folding has taken place in the western part of the upland called the Montserrat Hills. The rocks vary in age from Cretaceous to Miocene and in composition range from silts and shaley clays to resistant limestones and siliceous sandstones and conglomerates. Many rocks are of fine grain and are derived from foraminiferal, radiolarian and globigerinal oozes. Lignite deposits of lower Eocene age occur on the Northern flank. It is the underlying sands of the South

Central Range region which contain the oil and asphalt, so much more reliable today than sugar to the revenue of the island.

The Central Range varies in height from 500 feet in the west to 250 feet in the centre and east, with a maximum elevation of 1000 feet near the centre. Dissection is irregular but to the east and in the extreme west headstreams of rivers tend to follow the strike of the rock in a northeast - southwest direction. Gradients for communications here have been easy but only at the turn of the 20th century have people settled this region.

(4) A low lying arm of the Central Range extends south eastward to join the Southern Range, dividing the Southern Lowland into a physiographically similar eastern and western basin. These are the Naparima and Ortoire basins to the east, and the South Oropuche and other minor river basins to the west. However, it is the western basin which has been of greater significance for human settlement and is now the area on which more than 80% of the sugar cane is grown.

Marine clays and foraminiferal marls cover much of the west and, interbedded with or replacing these, in some areas, are more sandy and shallow deposits, apparently deltaic in origin.⁸ For the most part these deposits are of Miocene age. Rocks underlying this area have undergone intense compression resulting in overfolding and thrust-faulting. This is not

⁸Waring, Gerald, A., The Geology of the Island of Trinidad, British West Indies, Baltimore: John Hopkins Press, 1926, p. 25.

conspicuous on the surface but is important beneath in the accumulation of petroleum.

Generally the Southern Lowland is more undulating than the Northern plain and elevations are below 200 feet. Some uplift is indicated by the slight buff separating the middle Oropuche basin at an elevation of 50-100 feet, from the lower basin below at 25 feet. The South Oropuche River was, in the late nineteenth and early twentieth century, straightened before entering the sea, primarily for the entry of sloops for the purpose of loading sugar for export. Since the cessation of this mode of transport, this river like the others, has been greatly silted. The South Oropuche disappears in the Oropuche Swamp before reaching the sea.

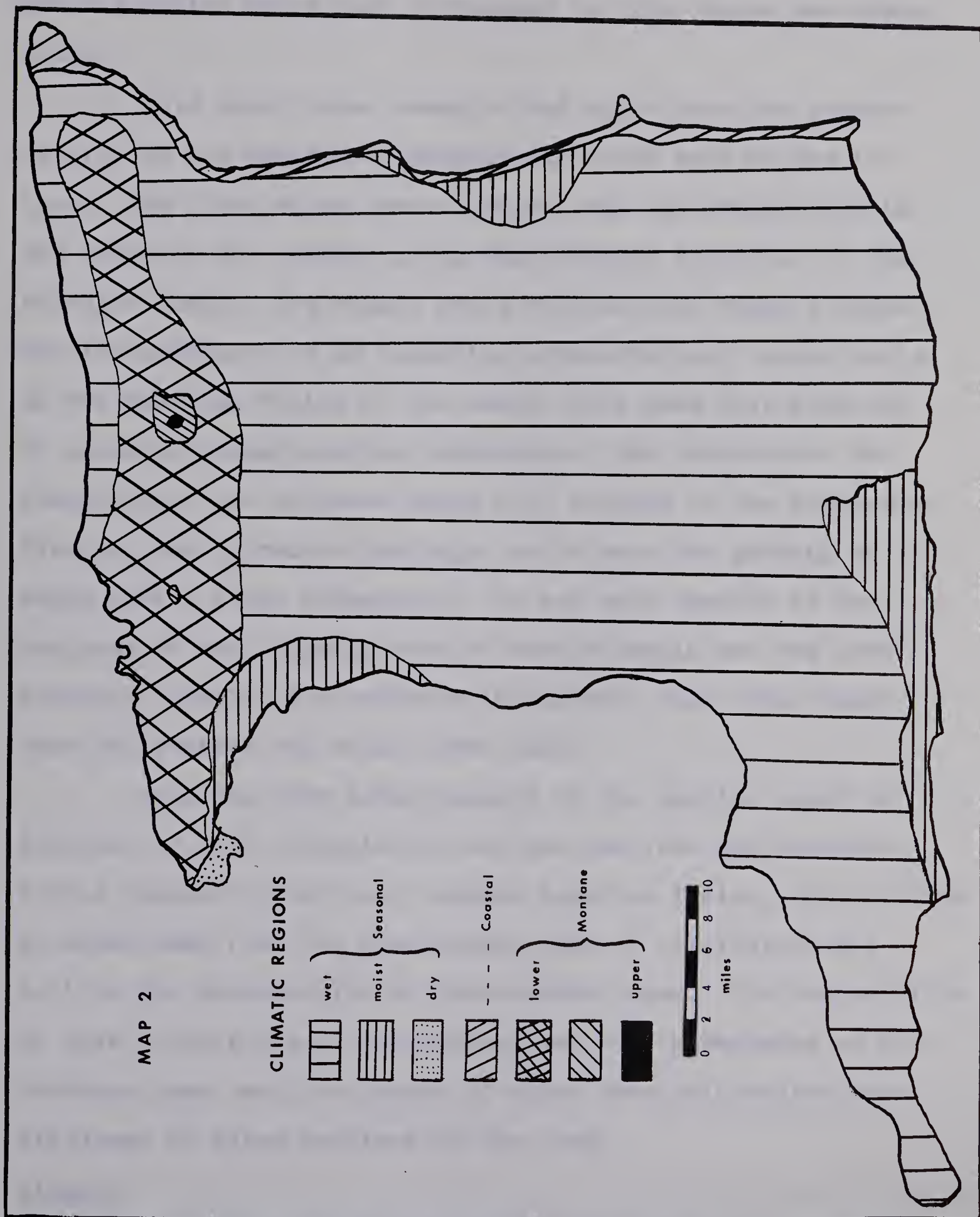
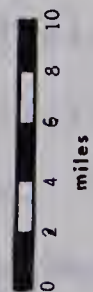
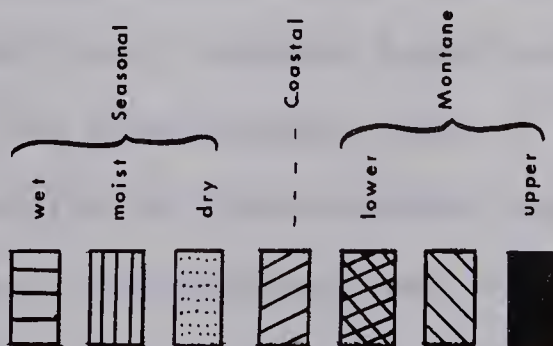
(5) The Southern Range is a moderate and ill-defined upland culminating in a maximum elevation of 997 feet. In general, elevations seldom reach over 500 feet. The rocks are similar to those of the Central Range, being Miocene sediments consisting of deltaic and other sands, silts and clays. The whole form a large anti-cline and subsidiary eastern folds within this general region are associated with oil accumulation.⁹ In this southern region where fault zones occur, mud volcanoes exist.

The surface aspect of this region presents a series of low rolling hills following the general east-west trend of

⁹Ibid., p. 128.

MAP 2

CLIMATIC REGIONS



the island. South and south-west flowing rivers form intermediate basins where most settlement in this region has taken place.

This study later reveals that sugar cane was planted chiefly on the western or sunnier and drier part of the island. The first major area of sugar cane cultivation was in the north of the island, along the southern foothills of the Northern Range. The virgin soils yielded good sugar returns but the pressures of an expanding population and richer soils in the Naparima Plains of the south, soon made this area one of secondary sugar growing importance. The land around the foothills of the Northern Range was exposed to the dangers of flooding and imperfect drainage, which made the growing of sugar cane a risky enterprise. It was only because of the nearness to the shipping port of Port-of-Spain and the proprietors' feeling for security in numbers, that early sugar cane cultivation was established here.

With the firm establishment of the English class in Trinidad by 1815, proprietors who had realised the potential of the undulating and well drained Naparima Plains, were willing to break away from the traditional area of cultivation and utilize the richer soils of the southern area. The adaptability of cane to this area, the physical and soil advantages of the southern area, and the spread of sugar cane cultivation, are discussed in later sections of the study.

Climate

Trinidad lies in the inter-tropical belt. According

to the broad Koeppen system of climatic classification it has an Am climate. Beard has classified Trinidad under seven climates, although 90% of the island falls under one classification of "wet-seasonal". The sugar cane growing zone of the island falls entirely into the wet-seasonal category.

The three main climates of Beard are (i) the Seasonal, (ii) the Coastal and (iii) the Montane, of which the first and last mentioned are each divisible into three sub-types, making seven local climates in all.¹⁰ The wet-seasonal climate is the major regional type, the others being variations of it due to one physiographic factor or another. (Map 2)

Temperature

In Trinidad the monthly mean temperature varies between 86.4 degrees F. in May, and 83 degrees in January, the range being 3.4 degrees F. The average monthly minimum temperature shows a range of 4.2 degrees between 67.7 degrees F. in February and 71.9 degrees F. in September. Diurnal variations range from 18.9 degrees F. in February to 16.0 degrees F. in September. Temperature levels are therefore adequate for the growth of a crop plant like the sugar cane.

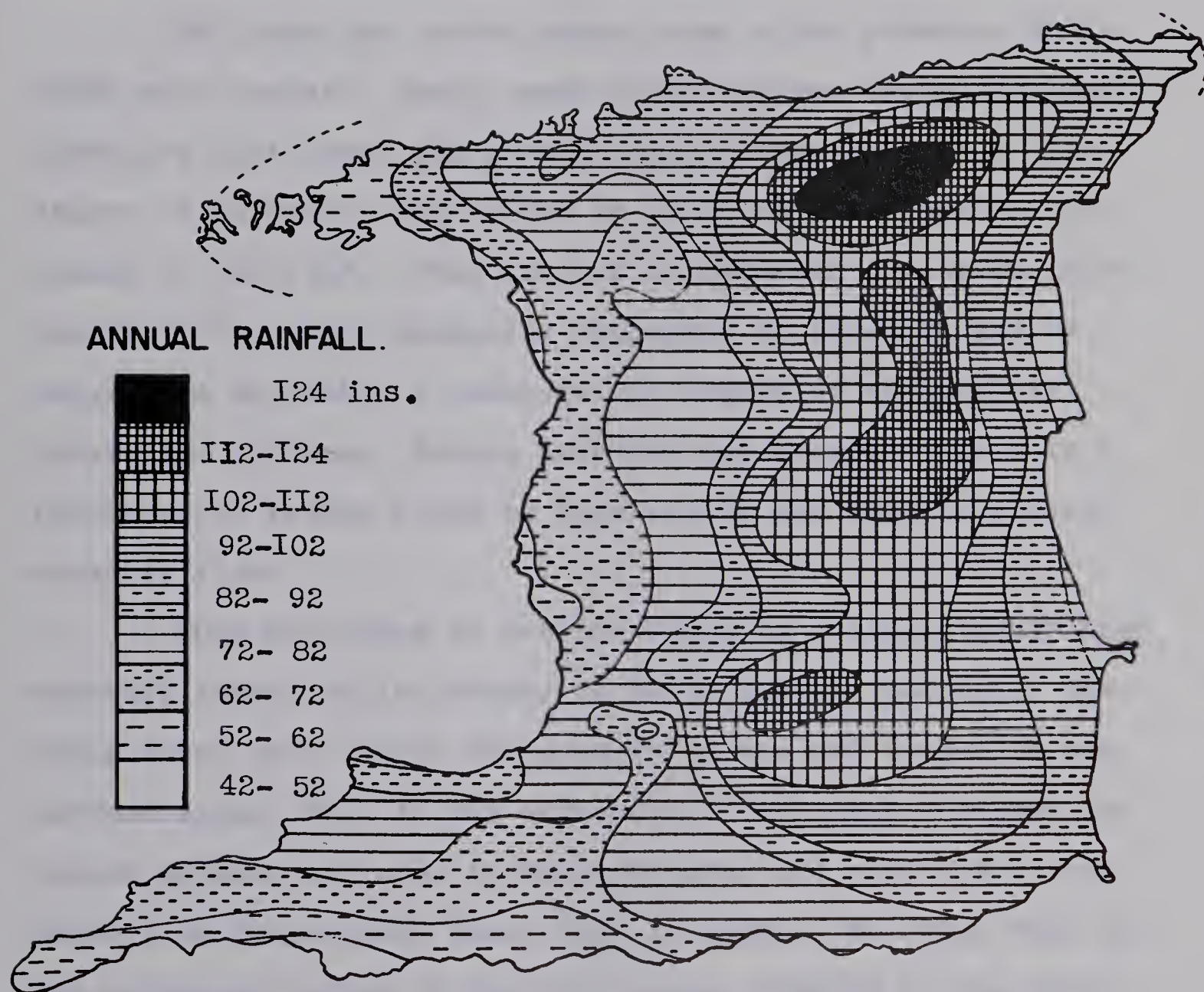
Precipitation

The precipitation region in Trinidad is also favourable to the requirements of the sugar cane. Garstang¹¹ has found that

¹⁰ Beard, J.S., The Natural Vegetation of Trinidad, Oxford: Clarendon Press, 1946, p. 19-20.

¹¹ Garstang, M., - A Study of the Rainfall Distribution of Trinidad, Mass: Woods Hole Oceanographic Institution, 1959, p. 2.

MAP 3



Mean Annual Rainfall

the distribution of rainfall over the island during both the wet and dry season is essentially the same. (Map 3) The amount of precipitation is however, a function of the synoptic disturbances and it therefore follows the seasonal pattern of these disturbances.

He found the establishment soon after November of the North east trades. These reach their maximum during February, March and April when characteristically they exhibit a high degree of constancy with which is correlated the maximum wind speeds of the year. This pattern is replaced by a more southeasterly flow which gradually decreases in strength and by August and September a considerable degree of variability enters the picture. During November and December there is a fairly rapid return first to an easterly and then to a north easterly flow.

Thus from June to October there is a consistently high moisture income while January to March has low incomes. Garstang found that 90% of the showers in the wet season on the western areas, fell in the afternoon (12-6 p.m.). In the dry season showers are also in the afternoon and only 25% of the showers on the western coast fell at night. He found that in the afternoon period of the dry season, 50%-75% of the precipitation occurred but these were in short bursts usually of six minutes duration. These showers are mostly less than .016" while wet season amounts are most frequently below .04".

What this means is that the sugar cane plant grown

mainly on the west coastland receives a maximum of sunlight during the daytime in the wet season since rains are mostly after noon, while dry season rainfall is confined to afternoon showers but in very short bursts. The transitional periods of September and October (Petit Careme or Little Dry Season) do not adversely affect sugar cane growth since the lower troposphere continues to be extremely moist to considerable heights.¹²

Soils and Soil Water Relations:

Soils in Trinidad have been classified by F. Hardy according to natural drainage.¹³ In tracing the historical introduction of sugar cane to Trinidad, it will be found that the initial areas of settlement were determined by proximity to sea ports, and the spread of sugar cane was controlled by this factor rather than by physical ones at first.

In Trinidad, it is the water relations rather than the soil type that have determined the spread of sugar cane. As a result, the water relations have been studied by Hardy who has grouped soils on the basis of natural drainage: (1) free, (2) partially impeded, (3) impeded. Each group is subdivided according to derivation from calcareous or non-calcareous parent material. Lime content, by its effect on the behaviour of soil water has been found to be almost the major chemical factor influencing vegetative growth of the cane.

¹² Ibid., p. 11.

¹³ Hardy, F., - "Water Table Fluctuations in certain Trinidad Sugar-cane Soils", Minutes and Proceedings of the Sugar Cane Investigation Committee, Part XXI, pp. 319-329.

MAP 4

Drainage groups of the soils of

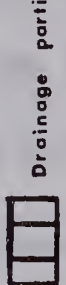
Trinidad



Drainage Excessive



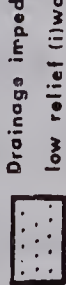
Drainage Free



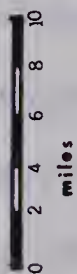
Drainage partially impeded



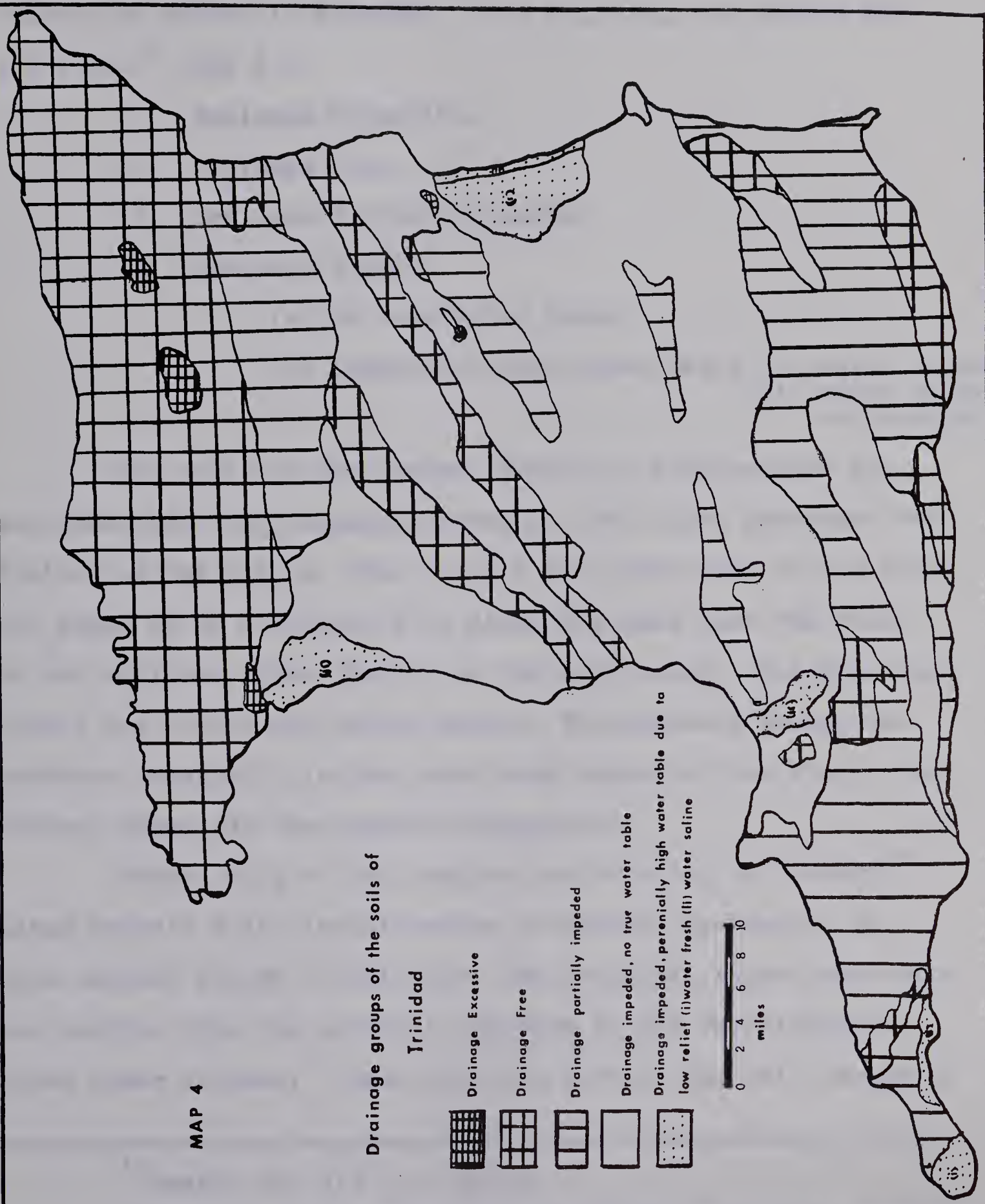
Drainage impeded, no true water table



Drainage impeded, perennially high water table due to low relief (i) water fresh (ii) water saline



miles



Beard has adapted Hardy's study to explain natural vegetation growth in Trinidad. The following are Beards subdivisions¹⁴ (Map 4).

- (1) Drainage Excessive.
- (2) Drainage Free.
- (3) Drainage Partially Impeded
- (4) Drainage Impeded
 - (a) No true water table
 - (b) Perennially high water table (i) water fresh
(ii) water saline
or brackish

The soils of the Central Region of Trinidad are the most important for sugarcane growing. This area comprises the "waist" of the island, that is, all the land south of the Northern Range to an arbitrary line drawn due west from the mouth of the Godineau River (Map 1) to the east coast. The area includes the Caroni and Nariva swamps, The Northern Plain, the Northern Peneplain (in the south west corner of the Plain), the Central Range and the Naparima Peneplain.

These soils of this region are detailed by Chenery¹⁵ using Beard's soil classification of natural drainage. In this Central region of Trinidad, the principal sugar cane soils are derived from the alluvial deposits of the Caroni-Capara-Couva river systems. These deposits provide the soil series of

¹⁴Beard, op. cit., p. 19-20.

¹⁵Chenery, E.M., The Soils of Central Trinidad, Trinidad; Government Printing Office, 1952, p. 16-33.

Tacarigua, Orange Grove-Pasea, Cunupia, Washington, Waterloo, Bejucal, Frederick, Couva, McBean, Freeport, Caracas and Sevilla. All except the last two series are non-calcareous. South of the Central region in the Naparima Peneplain, the soils are clay with about equal proportions of rocks of calcareous (Tarouba and Princes Town series) and non-calcareous origin (Talparo series).

Trinidad's physical environment was suited for the growth of sugar cane. Temperature and precipitation conditions were adequate and the relief of the land permitted ease of cultivation and transportation to the milling and shipping centres. The conditions of natural drainage and soil were not in all cases ideal for the spread of a common variety of cane. However, cane varietal research in the late nineteenth century eliminated the problem of growing a common cane variety on all Trinidad soils, and different varieties were bred to adapt to the different physical backgrounds. These varieties and their adaptations are discussed more fully, later in the text.

CHAPTER TWO

THE INTRODUCTION OF SUGAR CANE

Sugar Cane (Saccharum spp) is an old world plant cultivated first in the South eastern Pacific chiefly India and grown in China since 766 B. C. It took nearly 1000 years to reach Persia and by 600 A. D. a great industry had developed in Persia. The Arabs carried it in their conquests through the Mediterranean area to Spain. From Spain it was taken to the Canary Islands and in 1506 it was brought from the Canaries to Santo Domingo by a Spaniard named Aviglon.¹

By 1509 it was being cultivated on some considerable scale in the New World. Though cane cultivation spread to Brazil and Mexico by 1520 and to Peru by 1533, the islands of the West-Indies had much later dates of introduction. Barbados first grew cane in 1625 and Antigua in 1674. For Trinidad the time of introduction is apparently unrecorded but it was prior to 1727. The cane grown was "creole". It tended to assume a violet colour when it was unripe and for this reason

¹Herrera Y Tordesillas, A., The General History of the Vast Continent and Islands of America, commonly called the West Indies, London: J. Battley, 1725-26, V2, p. 155, translated from the Spanish by Capt. J. Stevens.

appears to have been referred to as "violaceous".² It formed a thin cane which had a sweet juice and was very good for chewing because of its softness. An additional advantage was the ease with which it could be milled.

This "creole" cane was most certainly the Puri cane of India and was the only variety grown in the New World until 1793 with Capt. Blighs' introduction of the Otaheitian variety to St. Vincent.

As early as 1597, Don Antonio de Berrio had said of the island of Trinidad "It is a land very abundant in yucca*, maize and sugar cane. The undergrowth is of plantain, there are plenty of potatoes, a great quantity of cotton."³ Yet in 1637 it is said that "nothing was cultivated in Trinidad in any quantity except tobacco which was collected annually by a Spanish ship".⁴ No further reference is made to sugar cane in Trinidad until 1746 and it is quite possible that sugar cane cultivation existed purely for domestic use.

Meanwhile cocoa (Theobroma cacao) was introduced and soon became the leading export crop of Trinidad. In 1727 the fungus "Phytophthora palmivora" attacked the trees and the blight destroyed the planters' income. Cocoa had for some time been almost the sole source of income for most Spanish planters in Trinidad and a state of general bankruptcy followed the ruin

² Journal of the Imperial College of Tropical Agriculture, Trinidad: St. Augustine, 1939, V. 16, p. 102.

³ Trinidad Historical Society, Publication No. 16.

⁴ Journal of the Imperial College of Tropical Agriculture, Trinidad: St. Augustine, 1944, V. 21, p. 23.

*yucca - cassava

of the plantations. In 1733 when a census was taken, there were only 162 non-Indian adults on the island and these few remaining Spaniards too poor to move to other islands, cultivated small patches of land for food.

By 1735 people were beginning to return to the island either following the return of some missionaries or as a result of a revival of interest in El Dorado by the son of the governor of the island of Margarita (north of Cumana, Venezuela).

Sugar cane cultivation remained the only crop alternative for the new residents, especially since the terrors of the cocoa blight were fresh in their memories. By 1746 sugar had assumed first place among exports and was a luxury crop selling at 75 cents per lb.⁵* Tobacco ~~was a~~ subsidiary commercial crop and cocoa had disappeared entirely from the export lists.

Sugar cane was grown chiefly in the area around present day Port-of-Spain. A population of about 400 Europeans were described as "hard working and peaceable" people who planted corn, sugar cane and ground provisions on lands surrounding the young towns of Port-of-Spain and St. Joseph. Their knowledge of sugar cane cultivation was gained from trial and error, the improved methods of the French island planters not having yet reached the island. As a result there was a distinct lack of quality in the sugar produced and a haphazard method in crop cultivation. The people in Port-of-Spain manufactured and even

⁵ Borde, P.G.L., Histoire de l'île de la Trinidad sous le gouvernement espagnol, Paris: Mai Sonneone et cie, 1846-1882, V. 2, p. 105.

*-money value in 1746.

exported some quantities of raw sugar in enough quantities to make it the leading export crop of the island until 1765. Their method of sugar extraction was primitive but yet effective.

It might be useful to describe the process of manufacture at this stage. The initial step in "constructing" a sugar mill was the selection of a tree of "reasonable" circumference. A large hole was dug on the side of the trunk at a height of about three feet from the ground. A wooden tray, triangular in shape was placed immediately below the hole, with the base of the triangle resting on the trunk and the apex inclined toward the ground at an angle of 25 or 35 degrees. The end of a long rod of hard wood was placed in the hole of the trunk and one or two pieces of cane placed at a time, in the hole, and resting on the tray. The wood was rotated using the tree as a fulcrum and as the canes were crushed others were fed onto the tray.

The juice was drained into a receptacle below the triangular tray and eventually heated in large iron "coppers". It was then left to cool and crystallize. The raw sugar called papelona was cut into squares weighing 3 pounds and wrapped in plantain leaves and sold about the town.⁶ A great deal of rum was also distilled from the juice and every man was his own rum-maker with his private distillery.

At that time (1765) there were only about three stores in Port-of-Spain which for the most part traded the sugar, fish

⁶ Ottley, C.F., Spanish Trinidad, Port-of-Spain: College Press, 1955, p. 52.

and cassava flour made by the citizens for iron mongery and other forms of merchandise brought to Trinidad from the mainland in pirogues, and from Europe in the small vessels which carried on a contraband trade with the Spaniards. At that time money was non-existent in Trinidad and trade was carried on by barter.⁷

Meanwhile cocoa (forastero) was reintroduced by the Aragonese Capuchins between 1756 and 1758.⁸ For a long time production remained low because of fears of recurrence of the blight and because trees took about ten to twelve years to reach maturity. Cocoa however did not replace sugar cane in its growing areas but was replanted in the former sites in the foothills and valleys of the Northern Range. By 1775 cocoa production had progressed so rapidly that it was second to maize only as an export crop.

To the Spanish government at home, Trinidad was still an unimportant island, and frequent pleas for new settlers and financial aid fell on deaf ears in Madrid. Meanwhile inhabitants of the French islands of Martinique, Guadeloupe, Dominica, St. Lucia, St. Vincent and Grenada were also being plagued by a variety of hardships including hurricanes, ants which destroyed the sugar crop, bankruptcy, debts, the low price of coffee, soil exhaustion, as well as harassment from the

⁷ Ibid., p. 52.

⁸ Borde, op. cit., p. 116.

TABLE 1

French families willing to settle in
Trinidad under St. Laurents Scheme. (Ref.)

<u>Place of Origin</u>	<u>No. of families</u>	<u>No. of Europeans</u>	<u>No. of Slaves</u>
Martinique	286	1,144	24,710
Dominique	40	160	3,647
Granada	57	228	4,965
Other Islands	575	2,300	50,000
Total	958	3,832	83,322

Unfortunately, statistics are not available for the numbers who actually went to Trinidad.

Ref. - St. Laurent, Roume, Considerations sur l'etablissement d'une colonie en I'le de la Trinite appartenant a la cour d'Espagne (Ws. 1777)

Carib residents in these islands.

They found a leader in Roume de St. Laurent, a French planter from Grenada, who visited Trinidad. He submitted a memorandum to the King of France on March 20, 1777. The proposals were designed to facilitate the immigration of French planters into a Spanish Trinidad on estates to be worked by African slaves brought by the intended French settlers.

(Table 1)

The Spanish Government accepted the proposals of St. Laurent via the authority of the French Government. On November 20, 1783, the King of Spain issued the famous Cedula of Population opening Trinidad's doors under certain conditions to foreign immigrants. The terms of the cedula, summarised, were as follows:⁹

1. The foreigners must be Roman Catholics and subjects of nations in alliance with Spain.
2. They must take an oath of allegiance to Spain and agree to abide by the Spanish laws.
3. Every white immigrant, male or female, would receive 4 fanegas and 2/7ths of land and in addition half of that quantity for each slave introduced by him.
4. Free Negroes and people of colour would receive half the quantity of land assigned to whites, with an additional half for each slave introduced by them.
5. After five years residence in Trinidad the settlers and their children would have all the rights and pri-

⁹Williams, E., History of the People of Trinidad and Tobago, London: Andre Deutsch, 1964, p. 41-42.

villeges of naturalisation, including eligibility for public office and posts in the militia.

6. No head tax or personal tribute would be imposed upon the settlers at any time, except that after ten years they would each pay an annual sum of \$1.00 for each Negro or coloured slave with the guarantee that this sum would never be augmented.
7. During the first five years the settlers would be free to return to their countries or former place of abode and to take with them all goods and property introduced by them into Trinidad without any export duty.
8. The settlers would be free from the payment of tithes on the produce of their lands for ten years beginning January 1, 1785, after which they would pay only one-half tithe, that is to say, 5 per cent.
9. For the first ten years the settlers would be free from the payment of the royal duty on the sales of their produce and merchantable effects, after which they would pay only 5 per cent; but all their exports shipped to Spain in Spanish vessels would be for ever exempt from any duty on exportation.
10. All vessels belonging to the settlers, whatever their tonnage or make, would be registered in Trinidad and accounted Spanish vessels, as well as vessels acquired from foreigners by purchase or

legal title before the end of the year 1786.

11. The negro slave trade would be totally free of duties for a period of ten years reckoned from the beginning of the year 1785, after which the settlers would pay only 5 per cent on the current value of slaves at the time of their importation.
12. The settlers would be permitted, under Government licence, to go to the West Indian islands in alliance with Spain, or to neutral islands, to procure slaves, on the understanding that only Spanish ships would be used.
13. For ten years computed from the beginning of the year 1785, Spanish subjects would be free to make voyages to Trinidad with their cargoes direct from ports of France in which Spanish Consuls were resident and to return direct to those ports with the products of Trinidad, except money, the exportation of which was absolutely prohibited by that route.
14. The royal officials in Caracas were instructed to purchase on the King's account and transport to Trinidad black cattle, mules and horses, and to sell them to the settlers at prime cost until such time as they had sufficient stock to supply themselves.
15. Similar instructions were issued with respect to the supply of flour and meal to Trinidad for a period of ten years.

16. All Spanish manufactures needed by the settlers for their agriculture were to be imported into Trinidad and sold to the settlers at prime cost during a period of ten years.
17. Two priests of known erudition and exemplary virtue and expert in foreign languages were to be appointed to Trinidad to act as parish priests to the new settlers.
18. The settlers were permitted to propose to the King, through the Governor, such Ordinances as were necessary for regulating the treatment of their slaves and preventing their flight.
19. The Governor was to take the utmost care to prevent the introduction of ants into Trinidad.
20. When the cultivation of sugar had become fully expanded in Trinidad, the settlers were to be allowed to establish refineries in Spain with all the privileges and freedom from duties previously extended to Spaniards or foreigners.
21. The settlers would enjoy the privilege of directing representations to the King through the medium of the Governor and the General Secretary of State for the Indies.

The cedula of colonization coincided with the arrival in Trinidad of its last and most distinguished of Spanish governors, Don Jose Maria Chacon. He proceeded to reorganize the

ineffective government which he had inherited. In 1787 he re-organized the administrative division of the colony which he divided into three parts with a Commissioner of Population in charge of each. The three divisions were as follows (Map 1): the first Las Cuevas, Salybia, Guanapo, Tacarigua, Laventille, St. Anne's, Tragarete, Maraval, Diego Martin, Carenage (virtually the limits of the present county of St. George) which includes the north-western part of the northern range and northern lowlands; the second, Naparima, Galeota, Cocal and Guatero which includes an area in the Southern Lowlands; the third, Guapo Los Gallas, and Guayaguayare, as the south westerly section of the western peninsula of Trinidad.

The first responsibility of the Commissioners of Population was complete census of population, including also plans for change of estate or plantation. Their second responsibility related to agriculture. They were to ascertain the area of land cleared, the area cultivated, the crops grown, the yield of those crops, the labour and machinery employed on plantations. They were to measure and survey each plantation and verify all litigation, past and pending; no land was to be alienated or sold without notice to the Commissioners.¹⁰ Their third responsibility related to all aspects of road building and maintenance while the fourth responsibility was to take cognisance of all violence. It was evident that Chacon was a man of ideas

¹⁰Ibid., p. 43.

and vision, who realised the importance of organisation for the effective running of the island. He was also aware of the treatment meted out to the slaves, and the Commissioners' fifth responsibility was to pay special attention to the government of the slaves. They were to prevent inhumanity to and ill-treatment of the slaves, to ensure that each plantation grew an adequate supply of provisions for the maintenance of the slaves, and to note particularly all offences involving slave and master or slave and freeman.

Chacon's second major reform was, in a proclamation of July 27th, 1785, the removal of some of the confusion relating to land grants, and land titles. His aim was to remove every impediment whatever to the cultivation of land hence a clause included Crown repossession of land not cultivated or unlikely to be cultivated in the near future.

This Proclamation of Chacon in 1785 represented "one of the most decisive and constructive efforts ever made in the West-Indies to deal with the problem of latifundia, or plantations which had, throughout the seventeenth and eighteenth centuries, impeded the full development of other colonies, particularly Jamaica".¹¹ It was intended also to take care of the situation which had arisen in such colonies as Barbados and the Leeward Islands where the large plantation had made it difficult for the small white settlers even to obtain a couple of acres of land for a small farm.

¹¹Ibid., p. 45.

But Chacon's reforms were not aimed solely at the protection of the government and slave masters. In 1789 he issued a cedula for the protection of slaves (Code Noir). This is summarised as follows:

1. All owners of slaves were obliged to instruct them in the principles of the Roman Catholic religion, were not to allow them to work on holy days, and were to provide at their expense a priest to say Mass for them and to administer the Holy Sacrament to them. At the end of every day's work the slaves were to say the Rosary in the presence of their master and his steward.
2. The Justices of the districts in which the estates were situated were to determine the quality and quantity of the food and clothes to be given daily to the slaves.
3. The first and principal occupation of slaves was to be agricultural and not labour that required a sedentary life. To this end the Justices of the towns and villages were to regulate the work to be done by the slaves in the course of the day, two hours daily being allowed to the slaves for labour on their own account. No slave was to work over the age of 60 or below the age of 17, and the women slaves were to be employed in work appropriate to their sex.

4. After Mass on holy days, slaves were to be free to divert themselves innocently in the presence of masters and stewards, care being taken to prevent the mixing of slaves on different estates or male slaves with the female or very excessive drinking. These diversions were to be ended before the time for prayers.
5. The slave owners were to provide commodious habitations for the slaves sufficient to protect them from the inclemencies of the weather with beds, blankets and other necessaries. Each slave was to have his own bed and there were to be no more than two slaves to a room. A separate habitation, warm and commodious was to be provided as an infirmary for sick slaves. The slave owner was to pay the charges of a slave funeral.
6. Slaves who, on account of old age or illness, were unable to work, as well as children, were to be maintained by their masters who were not to give them their liberty in order to get rid of them.
7. Masters of slaves were to encourage matrimony among slaves.
8. Slaves were not to be punished by more than 25 lashes, inflicted only by their masters or their stewards, in such a manner as not to cause contusion or effusion of blood.

9. For more serious offences, the slaves were to be reported by their masters or stewards to the Justice.
10. Masters or stewards who failed in the obligations imposed on them by the Cedula were to be fined \$50 for the first offence, \$100 for the second, and \$200 for the third.
11. Masters of slaves were to deliver annually to the Justice of the town or village in the district in which their estates were situated, a list signed and sworn to by them of all the slaves in their possession distinguishing sex and age.

Meanwhile the influx of the French colonists and their industry and knowledge in the cultivation of the land brought about a minor agrarian revolution, and with it, commerce and trade. The population jumped from 2,763 in 1783 to 10,422 in 1790 and most of the new settlers were French. Unfortunately figures are not available for the actual numbers of previously willing potential immigrants from the French islands, who did emigrate to Trinidad.

Their first major contribution to sugar cane agriculture in Trinidad was the introduction of the Otaheite, a Tahitian variety, by M. Hilaire Begorrat in 1792.¹² With the sugar cane also came the bamboo and the breadfruit, and it is of interest to note that the Tahitian variety of cane was first introduced to Venezuela from Trinidad in 1792. The cultivation of sugar cane was first started on the outskirts of Port-of-Spain

¹²Ottley, op. cit., p. 80.

at Laventille, and very soon all the other lands on the outskirts of Puerto or Port-of-Spain, Woodbrook, St. Clair, St. Ann's and Belmont were under heavy cultivation. (Map 1) It also grew well along the southern foothills of the Northern Range at Chaguaramas, the Maraval Valley, Diego Martin and later, some was planted along the east coast. Today not a vestige of these once prosperous plantations remains, as the sugar belt shifted to the centre and south of the island during the 19th century.

The establishment of the first sugar plantation is accredited to a M. de la Perouse in 1787, and this site is now occupied by the Lapeyrouse Cemetery near "downtown" Port-of-Spain. He was very successful in his plantation venture and his example was quickly emulated by other French proprietors. No literature is generally available on the organisation of the plantation system in Trinidad at that time, but it was most certainly worked by the African slaves brought by their masters from the other colonies. Chacon's Code Noir of 1789 suggests that some inhumane treatment must have been previously meted out to the slaves. At this time the large plantation was the exception rather than the rule and it was possible for abuse of slaves to go by un-noticed.

Sugar milling technology was still primitive in Chacon's time although there was an improvement on the old system of making papelona. The sugar mill now consisted mainly of three wooden cyclindrical rollers, standing perpendicularly on pivots of hard wood. The motive power was supplied either by half a dozen Negroes or two mules. The juice of the cane was then

heated to a high temperature until a thick syrup was produced. This liquid was poured into puncheons and left to crystallise, as the molasses or vesou drained off. The raw sugar was then treated with a mixture in order to refine it. The molasses was used for feeding the animals.¹³

Meanwhile, population growth continued at a rapid rate and there was an increase from 10,422 in 1790 to 18,627 in 1797, most of the immigrants being French. Most settled on the land to the east of Port-of-Spain along the southern foothills of the Northern Range. Many of them established small plantations along the eastern coast of the island and in Cedros, La Brea and Savonetta, all of which had close contact with the sea on the south west coast.

The slave population in 1797 numbered in all about 10,000 including men, women and children. This represented a proportionate distribution of about four for each household of the free population. Each of the small estates contained on the average 10 or 12 slaves including house servants. Consequently, the French master was forced to labour just as hard as his African slave. A system of crop diversification developed in an attempt at self-sufficiency and precluded the possibility of estate expansion. The crops grown were coffee on the hill slopes, cocoa on the hillsides and valleys, and sugar cane and tobacco in the valleys and on the plains. Subsistence crops of maize, cassava, yams and plantains were also grown for domes-

¹³Ibid., p. 80.

tic use, and it is not surprising that small settlements grew up around the island.

Within ten years of Chacon's arrival vast and meteoric changes took place and by 1794, the island's export trade had sky-rocketed from almost nothing to approximately one million* dollars.¹⁴ Trinidad shipped at that time 7,000 puncheons of sugar of 1,200 lbs. each, 330,000 lbs. of coffee, 224,000 lbs. of cotton, 96,000 lbs. of cocoa, and a small quantity of tobacco and indigo.

French influence was so great that Spain gained little or nothing from this trade, since the proceeds of it were used to purchase French merchandise, a good deal of which came from Martinique. Some trade was also carried on with Venezuela, a great part of which trade was contraband and was carried on in bays in the southern part of the island. This illegal trade was largely responsible for the development of these southern areas of settlement. The bulk of the legal trade was done only through Port-of-Spain in the north.

TRINIDAD AT THE TIME OF HER CAPITULATION: 1797.

Immigration of French families between 1783 and 1797, and the accompanying measures described above brought an improvement to the state of the island. Unfortunately this was short-lived, for the executions in Europe of Louis 16th of France and Marie Antoinette in 1793, had great repercussions in Trinidad.

¹⁴Borde, op. cit., p. 285.

*U.K. dollar value for 1850.

The resulting French Revolution ideas filtered into the West-Indies and the governor of Trinidad became afraid of his French settlers. For the first time colonisation by foreigners seemed of questionable desirability. Many of the French settlers were republicans, and Chacon made overtures of friendliness to the British, despite Spain's war with Britain in 1796. These did not go over well with the French settlers. They feared British domination and exacted a pledge from Chacon to defend the island against the British. When the hour of decision came Chacon backed down and allowed Trinidad to be taken by Sir Ralph Abercrombie on the 18th of February, 1797.

By 1797, the area under cultivation in Trinidad had been greatly extended. Chacon's Commissioners of Population had done a good job in assessing the wealth and potential for agriculture of the island. It may be noted that 282 proprietors were engaged in running 468 plantations, and these plantations were unique in the West-Indies, in that absentee landlordism was unknown. These 468 plantations covered 85,268 acres of land of which 37,960 acres were actually under cultivation.¹⁵ Table 2 illustrates the types of plantations which existed.¹⁶

Table 2

<u>CROP</u>	<u>NO. OF PLANTATIONS</u>	<u>PRODUCE</u>
Sugar	159	7,800 hogsheads
Coffee	130	330,000 lbs.
Cotton	103	224,000 lbs.
Tobacco	70	
Cocoa	6? or 60?	0 or 96,000 lbs.
Total	468	

¹⁵ Ibid., p. 277.

¹⁶ Ibid.

SURVEY - MADE BY QUARTERS IN JULY, 1797.

TABLE 3

Names of Quarters.	MANUFACTURERS.					WHITES.				COLOUR.				SLAVES.				INDIANS.				Total.	
	Water Mill.	Wind Mill.	Mills worked by Mules.	Coffee Mills.	Cotton Mills.	Rum Distilleries.	Men.	Women.	Boys.	Girls.	Men.	Women.	Boys.	Girls.	Men.	Women.	Boys.	Girls.					
Las Bocas	—	—	—	1	42	—	19	6	2	4	6	9	6	8	84	49	9	11	—	—	—	—	213
Le Caronage	—	—	10	5	18	5	29	11	12	12	40	54	24	13	250	219	72	66	—	—	—	—	802
Diego Martin	—	—	19	12	4	9	63	42	12	24	76	85	65	33	323	256	93	62	—	—	—	—	1134
Mucurapa	—	—	8	2	—	3	11	12	—	1	13	26	11	13	92	81	21	28	—	—	—	—	309
Tragaréte	—	—	3	—	—	2	7	9	3	1	4	11	—	1	109	87	25	19	—	—	—	—	276
St. Anne	1	—	5	24	16	2	21	9	12	6	52	58	36	41	164	167	39	39	—	—	—	—	644
Maraxal	1	—	2	7	1	4	21	8	5	2	36	49	31	25	200	119	59	56	—	—	—	—	611
Santa Cruz	—	—	—	5	—	—	7	5	7	11	64	58	46	43	48	39	24	22	—	—	—	—	374
La Ventille	—	—	1	16	25	—	9	7	—	1	33	52	24	25	103	93	43	29	—	—	—	—	419
Simaronero	—	1	4	5	1	3	5	1	—	—	16	14	10	11	140	69	33	24	—	—	—	—	323
Aricagua	—	—	6	7	—	2	14	13	6	12	46	44	47	27	162	123	50	45	—	—	—	—	589
St. JOSEPH	—	—	13	7	4	2	57	45	26	14	63	59	27	28	169	130	60	50	—	—	—	—	728
Maracal	—	—	3	4	—	1	18	14	12	2	23	18	20	13	66	31	16	15	—	—	—	—	248
Las Coiras	1	—	—	—	—	—	2	—	—	—	2	2	—	—	40	14	2	2	—	—	—	—	64
Tacarigua and Arouca	—	—	14	2	—	8	18	9	8	—	58	49	31	26	282	172	69	80	—	—	—	—	802
Arima and Guanapo	—	—	—	5	—	—	13	9	2	5	16	7	10	14	56	40	23	27	110	184	105	96	717
Toco, Salibia, and Cumana	—	—	1	—	59	—	7	7	7	7	7	12	19	24	51	56	27	20	57	50	20	28	399
Mayaro	—	—	1	—	65	—	28	12	6	2	13	16	9	6	146	84	40	41	—	—	—	—	401
Guayaguayare	—	—	1	—	74	—	26	10	15	10	6	17	14	9	132	79	56	34	—	—	—	—	410
Erin	—	—	—	—	1	—	1	1	1	2	20	14	15	12	8	4	1	—	—	—	—	—	79
Icaque and Gallos	—	—	5	—	3	—	27	18	6	4	47	41	11	6	116	79	8	11	—	—	—	—	375
La Brea	—	—	20	3	—	6	31	16	1	10	38	40	13	11	171	137	46	41	—	—	—	—	555
Siparia	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	50	49	26	14	140
Naparima	—	—	20	—	28	8	69	32	—	—	128	74	85	59	385	293	90	100	—	—	—	—	1379
Monserat & Savana Grande	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	88	118	39	48	293
Pointe a Pierre	—	—	6	—	3	1	12	18	9	2	24	10	6	6	73	76	26	30	—	—	—	—	292
Savanetta, Cuba & Cascajal	—	—	13	—	—	3	25	6	3	1	44	34	30	33	227	152	35	27	—	—	—	—	617
Puerto d'Espana	—	—	—	—	—	1	453	270	110	105	321	771	308	271	567	856	264	229	—	—	—	—	4525
TOTALS							994	596	301	266	1196	1624	898	758	4164	3705	1232	1108	305	404	190	126	

Agriculture provided most of the island's revenue. Food was grown both on plantations and by each slave in his own garden. Commercial crops included sugar cane, coffee, cotton, tobacco and indigo.

Sugar cane (Saccharum officinarum) had now become the dominant export crop. The cane grown had been evolved from four species of the genus *Saccharum*. In general however, the main distinction at this time in sugar canes is between the thin "Creole" and the thick Bourbon. Creole cane had been previously introduced into Trinidad while the Tahitian or Otaheitian variety of the Bourbon cane was introduced in 1792.

Sugar cane distribution in 1797 followed closely the older areas of settlement (Plate 1, table 3). Of the 159 mills producing sugar 155 were worked by mules, 3 by water and 1 by wind. The area around St. Joseph, the old capital city became a new area of cultivation while the favourable cane growing conditions were exploited in the southern areas of La Brea, Naparima and Savonetta.

The choice of suitable sites for sugar cane cultivation was still left largely to chance. A survey of the island's agricultural potential was conducted under the supervision of Captain J. Mallet (Table 4) in 1797, and he found 1313 portions of land (each containing 320 acres) suitable for sugar cane cultivation. This was slightly less than half of the 2720 portions of the entire land area suitable for agriculture and explains why sugar cane plantation owners were willing to settle

Sugar	Coffee	Cotton	Cocoa	Total
5	19	-	-	24
34	-	-	-	34
-	41	-	69	110
-	41	-	5	92
102	-	-	-	102
42	-	-	-	42
78	-	-	-	78
-	48	-	48	96
-	50	-	46	96
16	78	-	-	94
36	27	-	54	117
73	40	-	-	113
54	27	-	-	81
127	52	-	-	179
30	54	-	-	84
54	-	-	-	54
54	-	-	-	54
17	-	-	-	17
40	-	-	-	40
-	65	-	-	65
27	15	-	-	42
32	-	-	-	32
47	2	-	-	49
11	-	21	-	32
34	27	14	-	75
25	55	-	-	80
30	24	6	-	60
27	64	40	-	131
-	26	22	-	48
65	28	10	-	93
107	-	-	-	107
98	-	-	-	98
32	1	-	15	78
22	23	-	-	45
-	65	14	21	100
-	36	20	-	56
-	-	11	-	11
4	7	-	-	11
1313	945	158	304	2720

PLATE I- TRINIDAD IN 1797



A New Map
of the
ISLAND OF TRINIDAD,
made by Order of
His Majesty's Commanders in Chief
of the Forces in the West Indies
By W. MALLIET, Capt of the Surveying Ship

EXPLANATION
A line with dots shows the coast
A line with dots shows the coast
A line with dots shows the coast
A line with dots shows the coast
A line with dots shows the coast
A line with dots shows the coast
A line with dots shows the coast
A line with dots shows the coast
A line with dots shows the coast
A line with dots shows the coast

SCALE
English Miles 0 1 2 3 4 5 6 7 8 9 10
French Miles 0 1 2 3 4 5 6 7 8 9 10
Spanish Miles 0 1 2 3 4 5 6 7 8 9 10
Portuguese Miles 0 1 2 3 4 5 6 7 8 9 10
Dutch Miles 0 1 2 3 4 5 6 7 8 9 10
Russian Miles 0 1 2 3 4 5 6 7 8 9 10
Turkish Miles 0 1 2 3 4 5 6 7 8 9 10
Venetian Miles 0 1 2 3 4 5 6 7 8 9 10
Papal Miles 0 1 2 3 4 5 6 7 8 9 10
Austrian Miles 0 1 2 3 4 5 6 7 8 9 10

virgin areas. Up to this time (1797) however, 88 of the 158 mills were located in the Northern Plains, in a band running from Port-of-Spain east to Arouca (Map 1).

As was mentioned before, these areas were chosen for agricultural cultivation because most of the people lived here. There was east-west transportation link along the southern foothills of the Northern Range with Port-of-Spain. This contact was necessary for easy export of produce and imports of food-stuffs and clothing so vital to the continued successful operation of the estates.

This northern region of sugar cane cultivation posed many physical problems to the plantation proprietor. Most of the cane was grown in areas of impeded drainage or partially impeded drainage, but the proprietors were ignorant of cultivation techniques and were willing to reap the still bountiful produce from the virgin soils. No account is available of the methods of cultivation employed at the turn of the nineteenth century. The only reference made to sugar cane yields was by M. Begorrat who wrote on 1st October 1800 - "In 1792, I myself brought from Martinique a stool of the same (Otaheitian) which propagated to such an extent, as to serve inplanting our valley (Diego Martin) and also a great part of the island. This species has yielded from 21,000 to 22,000 lbs. per quarree whilst the country cane (Creole) planted in virgin lands hardly yielded 4,000 lbs." (Extract of a letter to Father Treprac)¹⁷

¹⁷de Verteuil, L.A.A., Anderson, A.W., Kernahan, and Swift, F.J., Three Essays on the Cultivation of the Sugar Cane in Trinidad with Remarks on the Processes at Present in the Use of the Manufacture of Sugar. Port-of-Spain: 'Standard' Office, 1848, Quoted from de Verteuil, p. 13.

Three essays written in 1848 claim that sugar cane cultivation was still left to chance and that "competition in sugar markets was unknown, and economy of time or labour formed no portion of the planter's philosophy".¹⁸ Up to 1848, sites for estates were chosen by the richness of the surface soil (judged by vegetative indicators of figues, balisier, wild plum, palmistes or pic moc, or black mould on surface); A second factor was the distance of cartage to and from the nearest shipping place.¹⁹ It is surprising therefore that Trinidad was able to hold her place in sugar exports in the West-Indian market and this success may be attributed to the richness of the virgin soils and proximity to export ports.

In 1797 population was approaching 18,000 (Table 3). Of these between 4-5000 lived in Puerto or Port-of-Spain and between 5-6000 in St. Joseph or San Jose; which was the former governmental capital of the island, and essentially a Spanish town. Four social classes could be recognised: proprietors, artisans, slaves and Amerindians. Most landowners were Europeans, but some were mestizos. The artisans came from the mestizo, mulatto, zambo and free black population. Slaves formed the third class and their value had almost trebled within a century,²⁰ being \$270 per slave in 1797 compared with \$100 in 1670.²¹ Amerindians were less fortunate than the generally

¹⁸Kernahan & Swift, p. 1.

¹⁹Ibid.

²⁰Borde, op. cit., p. 274.

²¹Ibid., p. 31.

dressée
Pour le Voyage de DAUXION LAFAISSE
et d'après les Observations astronomiques
de MM. Churucca et De Humboldt
par J.B. Poirson Ing^r Gén^r

well treated slaves. They had been relegated to the four Missions of Arima, Siparia, Toco and Savanna Grande, (Plate 2) and their numbers had continuously decreased.

As early as 1783 their lands around Arouca were taken away from them, in the interest of the new immigrants expected with the Cedula of Population. Legally they could now no longer hold land and were subjected to the government of the Jesuits in the Missions.

Borde observed that in 1818, the governor Ralph Woodford was desirous of "re-establishing the Mission of Arima in the rights and privileges which the laws accord to the Indians, and contributing by all means to its improvement and prosperity".²² The letter implies a neglect of the Mission, and this neglect was soon responsible for the quick eradication of this group of people.

By law, the Indians were confined to their Missions. They were considered as being inferior because of their relatively 'primitive' way of life and their racial difference resulted in indifferent treatment. It was soon obvious that the European's desire was to get rich quickly, so that the natives were forced to surrender their land for the sake of sugar canes' progress.

Population centres of the Island consisted of the four Missions, the two towns of Port-of-Spain and St. Joseph and the two market towns of San Juan d'Aricagua and San Fernando de Naparima.

²² Frazer, L.M. - History of Trinidad, 1813-1839, V. 2, Port-of-Spain: Gov't Printing Office, 1891, p. 102.

Such then was the island of Trinidad in 1797. The population was now large enough to be considered beyond the pioneering stage while agriculture was prosperous and trade active. Several small population centres had arisen and the people were aware of the dangers of monoculture because of the earlier failure of cocoa. In 13 years from the arrival of Chacon, the population had increased from 3,000 to 18,000 creating an island with roads, trade, public buildings and money, both in the private and public coffers. It was an era of great physical exertion and material progress, and also an era of gaiety, festivity and apparent good living for all, engendered by wise local administration.

1797-1807: PERIOD OF TRANSITION AND PROSPERITY.

Despite the change in ownership, the island of Trinidad continued to progress economically. The fears of the French of complete British domination were quickly dispelled by the friendly British attitude, and, very few of the former left the island.

Britain was much more active in colonial affairs than Spain had been and, to understand the subsequent agricultural and other developments, one must consider the factors significant in the forming of what has been called the "English Colonial Framework", as it was at the beginning of the nineteenth century.

European nations were strongly challenging the power of Spain during the seventeenth and eighteenth centuries, and the warring activities of the Dutch, both on the European continent

and in European waters, were to a great degree responsible for the opportunities afforded to the English and French to settle in the West-Indies. Spain's attention was directed largely to the silver and gold rich mines of Mexico and South America and it was with little opposition that France and England settled in the West-Indies from 1625 onwards.

At about the same time in England, it was felt that some measures were necessary to safeguard and encourage trade. Three important laws were passed, and these form the basic framework of English colonial policy.

(1) In 1651, Cromwell passed a Navigation Act whereby products of English plantations of Asia, Africa and America could only be imported to England or to her possessions on English or colonial ships of which the master and most of her crew were to be English. Conversely, goods exported from Europe could only be sent under similar conditions. The second Navigation Act passed in 1660 resulted in an English monopoly in sugar, tobacco, wool, cotton, indigo, ginger, fustic and other dye woods, by making it necessary to take these goods to the Mother Country before re-exporting them. In this way, Dutch trading activities were hampered and her sugar refining monopoly was weakened.

Secondly, the Staple Act of 1663 prevented European goods from being exported into the colonies, unless they had gone through Britain first.

Finally, the Plantation Act of 1673 saw the strict enforcement of duties on all exports from British colonies of the

previously mentioned articles. Britain's idea behind the passing of the Navigation Acts was to protect her own trade by raising of the tariff barrier, and to hinder commerce of the other European powers, regardless of its effects upon the trade of her own possessions. These Acts were eventually met with great resistance in Trinidad, as in the other British West-Indian Islands.

The Treaty of Utrecht in 1713 gave England the right to carry slaves to Spanish colonies, and under this guise contraband trade became common. As was previously mentioned, this illegal trade was a matter of concern in the then Spanish Trinidad. British West-Indian planters were becoming powerful in their own right and it was their traditional policy to have duties removed or reduced by the Mother Country. These planters gained their first big victory in 1733 when the Molasses Act was passed. Heavy duties were placed on all sugar, rum and molasses imported into Britain from countries other than her colonies. This was intended to cripple the growing sugar trade of the French and Dutch West-Indies, but, as will be seen later, the effort was not entirely successful.

The Sugar Act of 1739 was another blow for the British planter and made life even more prosperous for him. It allowed the shipping of sugar directly to foreign ports without the paying of duty to England. The British West Indies planter could now control sugar exports to Britain and the planters were able to direct London prices as they wished.

Up to the Treaty of Paris in 1763, the life of the British West Indies planter was quiet and prosperous. However,

wars in Europe had repercussions in the West Indies and islands changed hands frequently. Grenada, St. Vincent, Dominica and other islands which had been French before 1763, were in that year handed to Britain. In 1779 France again took possession of them, but in 1789 they were regained by Britain. Improvements came with the Industrial Revolution and with the aid of protective tariffs, Hispaniola as a French sugar colony produced for a time, about 70% as much sugar as all the British West Indies islands together.^x

Despite these political disturbances sugar became the keystone to all West Indian affairs. London prices of the commodity rose sharply (Table 5) but Trinidad was not involved in this prosperity. The acquisition of Trinidad in 1797 provided her new Motherland with an almost untouched field, ideally suited for the cultivation of sugar cane, the crop which was to be the basis of Trinidad's economy for the next century.

Table 5 LONDON PRICES OF SUGAR CANE - 1760-1806

1760.....	32/	to 47/ -	^a
1770.....	31/	- 42/ -	
1780.....	45/	- 59/ -	
1784.....	26/	- 46/ -	
1787.....	41/	- 52/ -	
1793.....	32/	-.....	^b
1797.....	51/	-.....	^c
1798.....	89/	-.....	^b
1800-01.....	28/	- 50/ -	^d
1806.....	26/	-.....	^c

Steps were now taken by Britain to remedy the recurrent labour shortage problem. Between 1801 and 1807 Trinidad imported

^x Sugar Exports of Hispaniola in 1788 - 145,000,000 lbs.
 Sugar Exports of British West Indies in 1790 -
 211,000,000 lbs.

Table 6

POPULATION OF TRINIDAD FROM 1797 TO 1808^{*}

Year	Whites	Coloured	Indian	Slaves	Total
1797	2,086	4,466	1,082	10,008	17,643
1798					
1799	2,128	4,594	1,148	14,110	21,980
1800	2,359	4,408	1,071	15,012	22,850
1801	2,153	4,900	1,212	15,964	24,229
1802	2,222	5,275	1,166	19,709	28,372
1803	2,261	6,102	1,416	20,925	30,704
1804	2,561	6,802	1,416	20,925	31,084
1805	2,434	5,801	1,733	20,108	30,076
1806	2,274	5,401	1,697	21,761	31,133
1807					
1808	2,476	5,450	1,635	21,895	31,456 ^{**}

* - Frazer, op. cit., p. 288.

** - Williams, op. cit., p. 67-68.

and retained some 4,500 slaves per year (Table 6). In the years 1802-1803 for example, she claimed 4,336 of the 14,730 slaves brought to the British West Indies.²³ Despite this, by the year 1807, Trinidad had an average of only one slave for every seven acres of land cultivated, compared with an average of one slave for every acre of land cultivated in the rest of the British Caribbean.²⁴

The Trinidad planter found great difficulty in procuring more slaves. In Britain there was now the acceptance in principle of gradual abolition of the slave trade, a general crusade against slavery. The fact that slave traders were no longer dependent upon slavery for their capital accumulation prevented them from being actively in opposition to both these movements.

These were reinforced by two other considerations of great importance. The first was the lesson of the slave revolution in Haiti in 1795 and the growing recognition of the danger

²³a-Edwards, Bryan, The History, Civil and Commercial, of the British Colonies in the West Indies, London: J. Stockdale, 1794, V. 2, p. 510 and V. 3, p. 144.

b- Tooke, Thomas - A History of Prices and the State of Circulation from 1793-1837, London: Longmans, Orme, Brown, Green and Longmans, 1838-57, v. 1.

c- Young, W., - The West Indies Common Place Look, London: R. Phillips, 1807, p. 42.

d- The Journal of the I.C.T.A., Trinidad: St. Augustine, 1935, V. 12, p. 189.

e-Young, op. cit., p. 42.

²⁴Tropical Agriculture, V. 12, p. 4.

Table 7

PRODUCE OF TRINIDAD EXPORTED FROM 1789-1820

Years	Sugar lbs.	Cocoa lbs.	Coffee lbs.	Cotton lbs.	Rum Galls.	Syrup Galls.
1799	8,419,859	238,390	339,913	323,415	170,671	142,636
1800	9,895,634	284,170	449,614	317,395	194,488	129,507
1801	15,461,912	324,720	328,666	262,997	343,113	173,369
1802	14,164,984	138,669	278,274	190,210	350,049	143,237
1803	16,014,056	361,070	185,658	478,046	344,292	214,120
1804	18,595,416	503,210	304,138	164,069	371,544	355,877
1805	29,438,276	527,640	286,379	256,792	426,469	564,558
1806	29,045,439	588,805	418,049	167,700	399,122	649,432
1807	...	...	...	...	...	...
1808	29,950,928	668,993	387,028	139,200	940,564	606,100
1809	24,856,973	719,230	264,330	134,190	539,081	477,262
1810	21,746,775	726,173	295,443	114,980	403,870	82,163
1811	18,513,302	640,732	276,243	159,136	426,691	324,942
1812	29,971,580	1375,539	282,460	130,390	548,014	366,070
1813	22,208,145	1029,512	540,716	184,400	666,761	301,795
1814	21,604,058	1158,163	382,888	148,505	487,142	262,098
1815	25,075,281	1065,808	262,289	115,150	523,632	682,718
1816	24,122,415	1056,662	119,974	303,045	449,067	373,873
1817	22,784,767	1311,461	215,190	65,951	371,422	351,234
1818	23,200,326	1232,685	224,972	109,070	439,662	415,251
1819	30,205,731	1506,445	258,220	131,990	534,626	545,466
1820	30,714,363	1744,465	211,555	96,545	524,316	474,001

of servile revolt. The second was the recognition of the British West Indies planters themselves, in the older islands of Jamaica, Barbados, Antigua, St. Kitts and others that they could not possibly compete in the British market against the virgin soils of Trinidad. In their own self-interest therefore, they were prepared to demand that, whilst the slave trade should be allowed to continue to the older islands, it should be decisively prohibited in Trinidad and in their other rival British Guiana.²⁵ It will be seen however, that after the abolition of the slave trade in 1807, a considerable inter-colonial slave trade developed, resulting in a tremendous rise in the population of Trinidad.

The British West Indies sugar exports increased from 176,270 Hogsheads (of indeterminate weight) in 1799 to 216,227 in 1805 and in the same year, Trinidad alone exported only 9,000 and 12,000 Hogsheads respectively. (Table 7)

Trinidad was noted for the relatively high yields of sugar which averaged 11.8 hundredweights per slave or four tons per acre. The recency of exploitation of the rich virgin soils as well as possible intense use of the limited labour supply were presumably partly responsible for the high yields obtained,²⁶ for Trinidad was notorious for the high death rate among its slaves.

²⁵Williams, op. cit., p. 65-66.

²⁶Mathieson, W.L., British Slavery and its Abolition, London: Longmans Green and Co. Ltd., 1926, p. 105.

TABLE 8

PLANTATION TYPES IN TRINIDAD 1796-1807*

TYPE OF PLAN- TATION	1796		1801		1802		1807	
	Plts	Prod. (lbs)	Plts	Prod. (lbs)	Plts	Prod. (lbs)	Plts	Prod. (lbs)
Sugar	159	9,000,000	192	15,461,912	193	15,461,000	214	21,234,600
Cocoa	60	96,000	57	97,000	157	97,000		355,000
Coffee	130	330,000	128	358,660	128	358,660		500,000
Cotton	103	224,000	101	263,000	101	263,000		800,000

* - Lavaysse, p. 334 and Frazer, p. 151.

Though no statistics appear to be available for the extent of cultivated land, there was an increase in the island's exports and in the number of plantations (Table 8). Sugar production tended to increase more rapidly than other crops but exports of all commodities grew, especially after 1802.

Sugar plantations were still small and widely scattered. Cotton, which was previously grown in Mayaro and Guayaguayare gave way to sugar cultivation, and in 1804, 186 French settlers with 780 slaves were taking advantage of the fertility of virgin soils. This was an increase of 123 white settlers over the 1797 figure of 55, and gives an indication of the increased use of land in Trinidad.

But the lack of hands on sugar estates severely limited their output. Of the 214 plantations in 1807, only one half made 50,000 lbs of sugar each, although there were many of the larger estates that made from 2-3,000 lbs each.²⁷ Many other cotton growing areas gave way to sugar cultivation especially after 1800. This was a result of the lucrative returns of the sugar industry and because of increasing cotton exports from the United States to Britain. Coffee production also declined as a result of British dis-interest and poor farming techniques.

Despite the increasing production of sugar, Trinidad as a British colony was now faced with the problem of obeying the Navigation Acts. Many of the small planters could not afford to ship their sugar and then wait for the sugar to be sold and

²⁷ Lavaysse, J.F. - A Statistical, Commercial, and Political Description of Venezuela, Trinidad, Margarita, and Tobago, London: 1820, p. 352.

the proceeds known. In a letter addressed to Lord Castlereagh around 1804 by Mr. Marryat, the Agent of the Colony, he stated: "Besides, in that new colony (Trinidad) the bulk of the sugars are so inferior in quality that they sell here for little more than the charges. I have seen sales of sugar which have averaged only three pounds fifteen shillings per hogshead, when the same sugar in barter with the Americas could have given the planter twenty pounds sterling per hogshead."

"When the Order in Council prohibiting the exportation of sugar to America arrived in Trinidad, the price of sugar fell to \$2.50 per cwt. a price absolutely ruinous to the planter, and the price of every necessary of life purchased from the Americas immediately doubled from the impossibility of paying for them".²⁸

No action was taken by Britain to alleviate the situation and contraband trade became a necessity for survival. In 1783 the island's trade was said to have been only 150 tons of general merchandise, but by 1802 the tonnage of exports had increased to 15,000, of which M. Lavaysse considers 10,000 to have been contraband. Between 1797 and 1802, smuggling to the extent of one million pounds sterling was carried on with Venezuela and it was because of this trade that the colonists were able to survive.

²⁸ quoted from Frazer, op. cit., p. 266.

Table 9 below gives an indication of the trade carried on:

Table 9

ABSTRACT OF IMPORTS INTO TRINIDAD FROM THE SPANISH MAIN
FROM JULY 21, 1803-JUNE 30, 1804

Launches	Cargoes	Value
	In Specie	\$268,610
	1,600 head cattle at \$40	64,000
	1,297 head mules at \$64	83,008
	Indigo (216 seroons)	62,400
818	697 bales cotton	41,820
	560 tons Lignum Vitae*	8,900
	580 cwts Tsajo (beef dried in the sun)	4,640
	Hides, cocoa, Salted Fish, Goats, Hogs, Sheep, Cows, Poultry and Plantains	400,000
		<u>\$933,378</u>

*-Lignum Vitae, hardwood used in factories

The use of mules and cattle on sugar plantations was still predominant. It was only in 1804 that a steam engine of Bolton and Watts Birmingham manufacture, was introduced into Trinidad. It replaced the cattle mills on some plantations though the majority of the conservative owners opposed its introduction. The engine, Lavaysse claims, had the power of 16 horses, and performed at a given time the work of three oxen or mule mills on a sugar plantation.²⁹

Until 1806, Trinidad was still considered to be in a fortunate position. Despite the Navigation Laws, trade continued to flourish and the high sugar yields of Trinidad soils

²⁹Lavaysse, op. cit., p. 340.

remained a main attraction. The problem of labour was the only serious drawback but the money conscious Trinidadian was not interested in the politics of the situation. His aim was to obtain the quickest returns possible and establish himself as a man of position in his new environment.

The series of blows that were to shake the economy of the island during the next 30 years, came as great surprises to the planters, who were so firmly entrenched in their own little world, that they were unprepared for the social changes made with time. The consciences of some people of the world were disturbing them and the period to 1845 marks an effort by the disturbed, to ease the evils of slavery off their minds. The social change was finally completed in 1838 with the abolition of slavery, but, for the consequences the planters were unprepared.

CHAPTER THREE

TRINIDAD-1807-1845

In 1807 the first definite step was taken to abolish slavery with legislation forbidding the importation of slaves from Africa to British Colonies. Of all the British West Indies islands, Trinidad felt this blow most severely. With the British acquisition of the territory in 1797 a high percentage of slaves imported into West Indies was claimed by Trinidad but the labour shortage problem was only partially off-set. In a debate in the British House of Commons on Trinidad in 1802, George Canning, prior to his becoming English Prime Minister stated:

"Only one twenty-fifth of the Island was now in cultivation and 10,000 Negroes were there already; to cultivate the whole would require 250,000 at a moderate calculation".¹

The new measure of 1807 meant a cessation in the importation of agricultural labour to Trinidad and as a partial remedy, the number of free days for slaves was reduced from 134 to 69.² In an effort to overcome this shortage enslaved Africans in other islands were imported into Trinidad often

¹Williams, op. cit., p. 66.

²Mathieson, op. cit., p. 150.

under pretext of domestic slaves. An illegal inter-island slave trade resulted and the port of San-Fernando in the south became the preferred landing spot for these slaves. It was the high value placed on slaves and the great fertility of the soils of Trinidad and Guiana which formed the background to this inter-colonial slave trade. The cost of a slave in Barbados and Antigua was only £35 or £ 40, in Guiana and Trinidad it was from £80 to £90. The relative fertility of Demarara and Barbados, as judged by exports, was in the proportion of 4 to one. In Demarara it took 200 days labour to produce 5000 lbs. of sugar; in Barbados 400. In the former sugar was produced without any outlay of capital for fertilizer, in the latter the spreading of fertilizers required 25% of the labour of the plantation. The canes in Trinidad produced sucrose matter in the proportion of 5 to 2 as compared with the older islands; the average output of sugar was 3 hogsheads per slave as compared with one in the other territories.³

This slave trade continued and developed with the connivance and the full protection of the authorities in Trinidad. But in 1824 the trade was legally abolished and severed Trinidad's last source of a labour supply. This rendered the 1822 law of free trade with all ports in Europe and the New World useless since there was no large labour to supply the sufficient quantities of exports for profitable trade.

Further difficulties were experienced by Trinidad land

³ Williams, op. cit., p. 75.

TABLE 10

PRODUCE OF TRINIDAD EXPORTED FROM 1821 to 1855

Years	SUGAR		MOLASSES		RUM	COCOA		COFFEE		COTTON		INDIGO
	Hld.	Tres.	Brls.	Puns.	Tes.	Puns.	Pounds	Pounds	Pounds	Bales	Sers.	Sers.
1821	20,412	576	7,999	2,730	..	1,208	1,214,093	192,555	268	..	..	..
1822	20,051	714	7,908	2,932	..	1,761	1,780,379	347,399	822	..	..	..
1823	23,362	510	7,038	6,245	..	566	2,424,703	299,408	460	..	..	..
1824	22,512	882	6,856	7,409	..	471	2,661,628	264,637	352	..	..	..
1825	25,841	1,370	7,890	7,896	..	68	2,760,603	177,348	492	..	567	..
1826	26,075	1,358	8,075	8,672	..	353	2,951,171	321,254	107	2,811	..	..
1827	29,605	1,320	7,613	8,694	..	589	3,696,144	273,424	201	2,368	..	..
1828	30,629	1,067	6,634	11,320	306	285	2,582,323	266,754	148	2,915	..	50
1829	19,812	1,877	5,184	10,686	596	559	2,756,603	199,015	123	1,234	..	10
1830	28,756	480	3,781	4,846	163	258	1,646,531	197,860	50	1,010	..	7
1831	25,912	449	5,500	8,297	94	853	1,888,822	19,994	31	250	..	12
1832	22,761	774	6,895	10,977	504	65	1,530,990	150,966	40	498	..	11
1833	26,280	583	5,165	9,964	590	13	3,090,526	276,959	47	817	..	31
1834	22,434	1,098	5,535	11,958	592	59	3,363,630	170,825	33	1,165	..	..
1835	23,956	1,125	4,768	9,458	577	115	2,744,643	102,707	102	585	..	59
1836	22,925	1,367	4,928	9,562	782	59	3,488,870	219,994	45	815	..	..
1837	20,721	1,078	3,622	8,842	666	11	2,507,483	194,740	38	1,243	..	..
1838	20,046	1,280	2,679	7,934	596	130	2,571,915	451,437	370	2,585	..	6
1839	16,942	1,310	3,538	7,715	444	112	2,914,068	212,982	2	1,785	..	6
1840	18,031	1,290	3,795	6,647	419	191	3,237,005	308,582	100	1,321	..	5
1841	19,176	1,251	2,713	6,772	371	22	1,122,220	144,930	..	1,190	..	..
1842	22,615	1,401	3,783	6,650	439	123	3,141,505	178,673	..	861	..	..
1843	20,370	1,327	4,863	9,557	339	43	2,803,295	394,583	4	2,390	..	..
1844	23,900	1,628	2,700	9,080	337	32	3,305,715	327,550	1	2,537	..	1
1845	23,730	1,320	3,538	10,185	402	222	4,021,198	168,836	..	777	..	6
1846	27,728	1,466	2,904	11,510	300	2	2,628,562	309,759	2	354	..	..
1847	26,316	2,068	6,068	11,288	357	1,076	3,738,376	134,026	237	41	..	34
1848	28,080	2,331	5,584	3,165	140	1,135	2,956,354	119,912	25	280	..	3
1849	23,892	2,374	6,422	12,934	329	718	4,728,186	28,405	729	235	..	7
1850	28,001	2,303	4,545	9,789	142	272	3,816,728	136,835	..	98	..	19
1851	31,408	3,157	7,561	10,709	121	528	5,008,920	74,416	..	30	..	8
1852	30,555	4,058	8,774	14,919	193	817	4,246,851	103,162	386	573	..	10
1853	33,930	3,505	6,601	13,162	216	1,213	4,842,875	61,115	224	557	..	1
1854	28,783	4,742	10,116	11,604	216	3,267	3,761,057	56,391	703	191	..	2
1855	31,362	3,820	5,980	6,256	88	3,735	5,427,351	48,056	51	164	..	268

owners about the year 1815 when the governor, Sir Ralph Woodford, issued a proclamation concerning land titles. Grants made by the Crown to Spanish settlers had never been properly registered or surveyed, and, generally, titles were not available. Despite the efforts of Chacon, the last Spanish Governors to unravel the problem of land ownership, the difficulty remained. Woodford's proclamation stated that at least one-fifth of the lands claimed should be cultivated; that there be at least one worker for every 16 acres of land;⁴ that "quit" rent be exacted for all grants. This last was later remitted on all lands held before the conquest.⁵

Discontent resulted from these measures and a commission was appointed by the British Parliament to investigate the matter more fully. A satisfactory settlement was not reached until 1824.⁶ Though this upheaval was of a minor order as far as agricultural production was concerned, (Table 10) it was of significance as a basis for the opening up of uncultivated parts of the island.

Meanwhile, the Trinidad planter made frequent appeals for a certain and continuous labour supply. In 1806, possibly as a result of the imminent slave trade abolition, a ship load of Chinese from Macao, consisting of 192 men and women was

⁴The Journal of I.C.T.A., Trinidad: St. Augustine, 1932, V. 9, p. 189.

⁵Ibid.

⁶Ibid.

brought to Cocorite, north of Port-of-Spain. Though only 23 survived the first year of settlement, it marked the beginning of a movement which was to gain momentum in later times and contribute to the heterogeneity of the island's present day population.

Some labourers came from Portugal in 1834 and 1839, others came from France in 1839, and some additional European immigrants in 1840.⁷ So poorly were the Portuguese treated that many of them died so that the Portuguese issued a plea in 1835 that the remaining survivors be returned home. Attempts to import natives from Asia as indentured servants, in 1838, were regarded as the beginnings of a new form of slave trade, and were stopped. In 1841, 170 Africans were brought from Sierra Leone, again as indentured workers but this experiment was stopped too, after 2 or 3 years. Nearly 4000 immigrants came to Trinidad between 1839 and 1841 and these were mostly from the other British West Indies islands. The government of Trinidad paid their passages⁸ in an effort to stem an outflow of proprietors because of the lack of labour.

Despite these efforts to recruit a labour supply for the colony the total population decreased from 41,120 in 1824 to 39,328 in 1838. (Table 11) After 1838 statistics for

⁷Williams, op. cit., p. 97.

⁸Burnley, W. H., Observations on the Present Condition of the Island of Trinidad and the actual state of the experiment of negro emancipation, London: Longmans, Brown, Green and Longmans, 1842, p. 176.

TABLE 11

POPULATION OF TRINIDAD 1808-1861*

	<u>Whites</u>	<u>Coloured</u>	<u>Indians</u>	<u>Chinese</u>	<u>Slaves</u>	<u>Apprentices</u>	<u>Total</u>
1808	2,470	6,478	1,635		21,895		32,448
1809	2,589	6,384	1,647		21,475		32,095
1810	2,487	6,269	1,659		20,728		31,143
1811	2,617	7,004	1,736		21,841		33,277
1812	2,765	7,066	1,804		21,900		33,535
1813	3,896	8,102	1,265		25,717		37,983
1814	3,127	8,714	1,236		25,409		38,482
1815	3,219	9,653	1,147		24,329		38,348
1816	3,512	10,655	1,141	24	25,871		41,203
1817	3,793	11,856	1,157	33	23,828		40,667
1818	3,221	11,337	939	28	22,380		37,905
1819	3,716	12,485	850	30	23,691		40,792
1820	3,707	13,965	910	28	22,738		41,348
1821	3,440	13,388	956	23	21,719		39,526
1822	3,341	13,392	893	20	23,227		40,873
1823	3,386	13,347	872	16	23,110		40,731
1824	3,313	13,995	783	12	23,117		41,120
1825	3,310	14,983	727	12	23,250		42,262
1826	3,113	10,352	...	..	23,123		42,790
1827	....	....	...	..	...		...
1828	4,326	16,412	...	..	22,436		48,994
1829	3,841	16,180	...	..	21,847		47,468
1830	....	....	...	..	...		...
1831	3,319	16,285	762	..	21,302		41,668
1832	3,682	16,302	...	..	20,265		44,865
1833	....	....	...	..	...		...
1834	3,632	18,724	...	..	...	16,569	38,945
1835	....	....	...	..	...	...	...
1836	....	....	...	..	...	40,354	...
1844	....	....	...	..	...	...	59,815
1851	....	....	...	..	...	...	68,600
1861	....	....	...	..	...	...	84,438

*Hart, op. cit., p. 157.

population were based on a great degree of guess work owing to the high incidence of squatting and a constantly shifting labour supply.

Meanwhile, legal measures proposed by the mother country were aimed at improving the conditions of life and labour of the slaves, on the Trinidad sugar estate. The principal features of an Order-in-Council of 1823 were as follows:

- (1) A protector of slaves whose duties were regulated was to be appointed.
- (2) Sunday markets were abolished.
- (3) The performance of any labour by field slaves between sunset on Saturday and sunrise on Monday was prohibited.
- (4) The carrying of any whip for the purpose of coercing slaves to perform labour was declared illegal.
- (5) No slave was to be punished until 24 hours after the offence and then only in the presence of at least one free person in addition to the person ordering the punishment.
- (6) The use of the whip on female slaves for any offence was prohibited.
- (7) Books and records, including one for punishments, were to be maintained.
- (8) The onus was placed on the slave owner to prove that no punishment was inflicted, should a slave prosecute the owner for improper punishment.

- (9) Marriages among slaves were to be encouraged.
- (10) The division of families when slaves were sold was prohibited.
- (11) The slave was permitted to possess and bequeath property.
- (12) The slave was permitted to manumit himself without the owner's consent.
- (13) The fee for manumission was fixed at not more than 20 shillings.
- (14) Appraisement of his value when a slave was affected in a mortgage or a law settlement was regulated.
- (15) When a slave under six years or over fifty was manumitted, the owner was required to provide gratuitously a bond of £200 so as to provide for his sustenance.
- (16) Clergymen were authorized to certify that slaves had sufficient religious instruction to understand the nature of an oath and to be competent witnesses in a Court of Law.⁹

The second British measure for the control and amelioration of slavery was the Slave Registration Bill of 1816. This Bill, as applied to Trinidad by an order-in-Council of March 26, 1812, was designed specifically, by establishment of a Public Registry for the registration of the names, description,

⁹Quoted from Williams, op, cit., p. 77-78.

births and deaths of all slaves, to prevent "illegal and clandestine importation of slaves into Trinidad in violation of the 1807 Bill for the Abolition of the Slave Trade". The registration, as of January 1814, produced a total of 25,717 slaves, of whom 8,633 were domestic slaves and 17,084 plantation slaves.¹⁰

Thus, it was against this background of an acute shortage of labour that Trinidad's economic development proceeded in the period between its annexation by Britain and the emancipation of the slaves in 1833. The period from 1820 to 1840 was a critical one for Trinidad. Within that period the constitutional question was settled by the establishment of a Crown Colony^{*} system. A compromise was arrived at in the question of laws, by not changing them completely at one time, but rather gradually, as it became necessary. By 1848 the last vestiges of Spanish law were removed.

Williams sees the establishment of a Crown Colony system of Government as a move to retain large land ownership in white hands, disregarding opinions of the governed. Woodford's laws of 1815 concerning the cultivation of land left a great deal of land available for cultivation by the emancipated labourers but the peasant could afford only small plots and had no capital for large scale agriculture. The emancipated slave, after receiving the wages he demanded for a few years,

¹⁰ Ibid.

^{*}All essential powers reserved to the British Government through the Governor. The island was therefore not self-governing.

did not have to put up with lower wages as his fellowman in Barbados had to, for instance. He either purchased a lot of land, squatted on Crown lands or simply went to the urban centres and engaged in trade.

The shortage of labour, the free movement of available labour after emancipation, the challenge of the financially sounder English planter, and the result of the Order in Council of 1823 resulted in great losses on sugar estates from 1820 onwards. These estates were being purchased by English concerns and capitalists, from their French owners, and it was on the basis of these lands purchased cheaply during the crisis of the 1820's through 1840's that the "sugar interest" in Trinidad gained the upper hand. Raymond Beachey sees the "period of prosperity" in the West Indies as based in great part on the "sacrificed estates of the crisis years."¹¹

The French planter was being challenged by the new English planter who had better financial connections in the Metropolis of Port-of-Spain, and who therefore managed to gain the upperhand over the best lands and plantations that were now devoted to sugar cultivation. The socially elite French Creole was thus forced to surrender partially his position resulting in great economic losses for him. From 1840 onwards the white creoles of French descent dedicated

¹¹ Beachey, R.W., "The Period of Prosperity in the British West Indies Sugar Industry and the Continental Bounty System, 1865-1884". Caribbean Historical Review, Dec. 1951, p. 80.

themselves to the opening up of new cocoa plantations. Their decline was now a fact and socially this sector became subordinate to the English elite in the Island's hierarchial pyramid.¹²

It was difficult for most planters at the beginning of the 1820 crisis, to understand the combination of circumstances previously alluded to. To them the immediate problem was one of labour shortage, and the Order-in-Council of 1823 was bitterly opposed. The devaluation in properties was therefore blamed solely on the "Slave Order", and the planters failed to appreciate the fact that the days of slave labour in the British Colonies were numbered.

But the depreciation in the value of property did exist and it created many problems for the displaced plantation owners. Examples of some estates are quoted for a better understanding of the situation as it existed at that time.

"The sales of the "Belle Vue" and "Mount Pleasant" estates in the valley of Cuesa, and the "Cascade" estate in Diego Martin, struck us with dismay; they brought considerably less, we believe, than half their original cost....."

"These estates, however, having been bought in by creditors, do not furnish so decisive a test by which to judge of the real depreciation of the value of property, as the sale of "La Peurta" estate which came fairly into the market and

¹²Maingot, A.P., Nineteenth Century Trinidad, University of Puerto Rico (Unpublished M.A. Thesis), 1962, 190 pages.

was subject to open competition before the doors of the Court."

"It will hardly be credited in Barbados or Jamaica, that this estate, consisting of 1,000 acres of land; with a set of new works, boilinghouse, curing house and distillery, built of English brick and slated - a new steam engine of 6 horse-power, a large and commodious house recently erected, with 115 head of cattle and mules and by slaves---within 5 miles of the Metropolis, and one mile of a shipping place, was sold for \$42,000, payable in 7 years without interest! The sale of the "Wellington" estate in the quarter of South Naparima before the doors of the Court, affords further data by which to judge of the depreciation of property in this Colony; This estate was sold in December, 1822, for \$43,200, and has quite recently been re-sold with the same number of slaves, but with 17 additional mules worth \$2,500 for only \$12,000, payable in three years without interest!!"¹³

After the Act of 1807 to stop the traffic in slaves, the economic situation rapidly deteriorated. When Sir Ralph Woodford assumed the office of governor in 1813, he found about £150 in the Public Chest, and liabilities amounting to nearly £14,000.¹⁴ Roads were few and bad and no efforts were yet made by the Imperial Government to alienate the Crown lands. A fire which had destroyed Port-of-Spain in 1809 set back the economic development of the island drastically, especially since

¹³ Frazer, L.M., History of Trinidad, 1813-39, V. 2., Port-of-Spain, Government Printing Office, 1891, p. 191.

¹⁴ Ibid., p. 212.

the money voted for restoration of the town was allegedly squandered.

Cocoa became the leading crop and, in 1818, Woodford emphasised that it was only by encouraging the growth of cocoa that Trinidad could be settled. The island's total exports of cocoa increased from 96,000 lbs in 1797 to 3,090,526 lbs. in 1833 (Tables 7 and 10). Thomas Coke wrote in 1810 that Trinidad's cocoa was, "cultivated in such perfection, that its reputation soon became great....and soon obtained a mercantile superiority that would admit of no rival either in price and fame".¹⁵ But the international cocoa market was not controlled by any system, and the continuing efforts of the English planter to buy out French creole interests led to constant fluctuations in the industry. In a petition of the cocoa planters made in 1832 they stated the deteriorated state of the industry:

"previous to the year 1827 the crops of cocoa gradually increased in quantity and value...this prosperous and lucrative state of the cultivation arose from the industry of 5,270 free subjects and their families and 3,000 slaves... Yet this once happy and independent population is in the present year, 1832, reduced to the greatest poverty and distress; their properties abandoned, or seized on writs of execution, or their slaves hired out the cultivation of cocoa not yielding them bread, and the interest of money being at from 30 to 40%." ¹⁶

The area of land under cocoa cultivation had decreased from 12,839 acres in 1828 to 7,000 acres in 1856, and in 1859

¹⁵Coke, T., History of the West Indies, London: 1810, V. 2, p. 38.

¹⁶Frazer, op. cit., p. 302.

Sewell observes that there was a possibility that cocoa might be totally abandoned.¹⁷ But the owners held on to their cocoa estates as well as possible and experimented with means of cultivation.

Meanwhile, slavery was brought to an end with the Emancipation Bill of 1833. Compensation to the amount of £20 million was paid by the British Government to the planters, and slaves were divided into three broad categories: predial* attached; the field slaves; predial unattached; and non-predial slaves, employed in service, such as on the wharves and domestic servants.

Trinidad with 17,439 slaves on emancipation had fewer slaves than Grenada (19,009), St. Vincent (18,114), Antigua (23,330), and Dominica-St. Kitts combined (27,331). Not only was Trinidad less significant as a slave colony than the vast majority of West Indies Colonies, but Trinidad's economic potential in comparison with that of the exhausted soil of the Older islands made the slave in Trinidad an infinitely more valuable piece of property than the slave in any other West Indies colony except British Guiana.¹⁸ The average compensation paid per slave was £58½ in British Guiana and just under £56 in Trinidad. This compares with an average of £25 in Barbados and Tobago and £23 in Jamaica. The slave in Grenada or St. Lucia or St. Vincent averaged £30 in respect of compensation money; in St.

¹⁷ Sewell, W., The Ordeal of Free Labour in the West-Indies, New York: 1st ed, 1861, p. 102.

¹⁸ Williams, op. cit., p. 83.

*predial - consisting of land or farms; landed, attached to land; derived from land.

Kitts, Nevis and Montserrat the figure was £20, while the figure for Antigua was £17.

There were few slaves in Trinidad in relation to the available land. Trinidad in 1833 was not a plantation society and was rather a society of small estates. The average slave owner in Trinidad had seven slaves compared with 23 in British Guiana. In Tobago it was 24 slaves per claim, in Antigua 21, 20 in St. Vincent, 18 in Grenada and Nevis, 17 in Montserrat, 15 in Jamaica, 13 in St. Kitts, 11 in St. Lucia and Dominica and 9 in Barbados.¹⁹

The average of seven slaves per claim in Trinidad creates a false picture. An analysis of 1,862 claims or 83% of the total claims reveal

30% were claims for ownership of 1 slave only

16% were claims for ownership of 2 slaves only

22% were claims for ownership of 3-5 slaves only

12% were claims for ownership of 6-10 slaves only

Therefore 80% of the slave owners in Trinidad in 1833 owned less than 10 slaves each and only 1% owned more than 100 slaves. By comparison, owners of less than 10 slaves constituted 60% of the slave owners in Tobago, St. Vincent and Dominica, 50% in Nevis and Montserrat. Persons owning more than 100 slaves constituted 12% of the slave owners in Tobago, 10% in Grenada and Nevis, 8% in Montserrat and St. Vincent.²⁰

¹⁹Ibid., p. 84.

²⁰Ibid.

A further point of importance was the high percentage of Trinidad slaves in the third category of service occupations, the compensation value being over £55½ as compared with £53½ in British Guiana, £24 in Jamaica, £23 in Barbados and £35 in Tobago. Therefore a great deal of the Trinidad slave labour was "wasted" on domestic servants; yardboys and so on, despite the chronic shortage of a labour supply.

William Sewell states that,²¹

"Perhaps in no island was impending ruin, consequent upon emancipation, so glaring, so palpable, so apparently certain, as it was in Trinidad after the liberation of the slaves."

An examination of the island in 1840 will help to explain Sewell's statement.

In 1802, the last year of Pictons Government, there were 193 sugar estates in Trinidad. By 1840, this number had diminished to 180 owing to the problems Trinidad faced in the preceding years. In 1840, most of these estates were very small and most of them were being cultivated at great losses to their owners.

The total area of the island was estimated at that time to be 1,287,680 acres,* of which 208,378, acres were granted lands and 1,079,301 ungranted. Most of the granted land

²¹ Sewell, op. cit., p. 102.

*-whereas the actual figure is about 1,190,400 acres. The actual figures of 1840 are retained since the percentage values will be correct.

portions were 100 quarrees or 320 acres and very few exceeded 500 or 600 acres.²² These grants were principally along the margin of the Gulf of Paria on the west coast; on the line of the Caroni river, north and south of it, and to the east the foothills of the Northern Range, where the nature of the terrain rendered a road more practicable. The only closely settled districts were in the sugar rich Naparima area and even here the penetration inland was not very deep. The unexplored interior of the island and the greater parts of the northern eastern and southern coasts were yet ungranted.

Of the 208,379 acres of granted land, only 43,265, acres were under cultivation. The breakdown was:²³

27,710 acres planted in canes or 180 sugar estates with
104 distilleries.

6,910 acres planted in cocoa

4,095 acres planted in coffee

6,313 acres planted in provisions

7,237 acres planted in pasture

43,265 is total cultivation.

The 165,114 acres of uncultivated but granted lands were situated in favourable areas for cultivation, as mentioned before. In the sugar rich area of South Naparima, cultivation extended only five to six miles inland, despite the most favourable conditions of soil and climate for sugar-cane growth. River transport inland in this area was almost nil

²²Burnley, op. cit., p. 107.

²³Ibid.

beyond the five mile range and the greatest set back to extended cultivation was the lack of roads. Material for road building including the gravel base was not available in this area and the rainy seasons would interminably render the unpaved roads useless. At this time, no railroads had yet been built and surveys estimated that it would cost \$30,000* per mile to build one.²⁴ Yet the surveys showed that this would still be cheaper than building roads, especially since annual repair costs would be almost nil. An excellent example to illustrate the transport conditions is given by a South Naparima farmer who was faced continuously by the problem of damage to the roads:

Question - "As a planter, do you think it would be a saving to you to pay a high price for a railway over such roads?"

Answer - "I think the saving it would create would enable an estate to pay interest upon \$10,000 advantageously, instead of continuing annually. But it is impossible to calculate all the expenses and losses incurred at present. The greater part of the crop must always be carted to the shipping place before it is sufficiently drained of the molasses, lest the sudden setting in of the rain should prevent it, by which a considerable loss of molasses is incurred; should the rain fall, it must then be put in bags on the backs of mules, and the empty hogsheads filled at the shipping place, which is a most expensive and troublesome process. Frequently, as I have stated, it has been arrested upon the estate altogether, the roads becoming too deep

²⁴ Ibid., p. 78.

*-money value in 1840.

for the last process. In this case it deteriorates much in quality and quantity, from the dampness of the weather, before the next season arrived. Last year a great quantity of sugar was locked up by the bad weather on every estate on the road; 14 hogsheads which I had at Bronte were reduced to 10 when finally shipped. There must have been 80 locked up at Jordan Hill, which is nearer the shipping place, and upon every hogshead so detained there must have been an additional loss of at least £10 sterling, from the intermediate fall in the market. Besides which no stores or supplies can in such seasons be got up to the estates, and the fish required for the subsistence of the negroes has to be carried up on their heads."²⁵

Sugar cultivation had extended 14 miles inland from Port-of-Spain along the foothills of the Northern Range. Good road building material made this progress possible, despite the planters knowledge of the superior soils for sugar cane cultivation in the Naparimas. There was also the historical advantage of earlier large scale settlement, determined by the nearness to the shipping port of Port-of-Spain and the need to band together for protection.

The richness of the Trinidad soil was known to all West-Indies planters. A planter examined by the Trinidad Agricultural Committee in 1841 estimated that it would take $2\frac{1}{2}$ -3 years to form a sugar estate in Trinidad and produce 200

²⁵Ibid., p. 103.

tons of sugar, after the forest was cleared. This could be done with a sufficiency of labour and the works and machinery necessary for harvesting and processing of sugar could be done simultaneously.²⁶

The problem was therefore one of labour. The cultivation techniques employed made the three year limit for growth and harvesting quite possible. The more knowledgeable planters always endeavoured to have a double stock of canes in the field at the same time, and to cut one half of them in alternate years. It was found that canes did not ripen properly in one year, thus forcing this method of cultivation. But the methods of cultivation and manufacturing were still left to chance. Barbados planters estimated that the soil could produce $2\frac{1}{2}$ tons of sugar per acre with proper cultivation, and the 15 cwt. per acre production in Trinidad reflects the poor methods employed. The actual methods of cultivation employed are discussed in detail in the following chapter.

Despite the cultivation techniques employed, the sugar production of the island increased. This was partially due to the increase in acreage in sugar cultivation, but the chief reason for the leap in production was the richness of the soil. Ratoons* often lasted 40 years in the Naparima soils and nearly all of the ratoons in this area were 20 years old.²⁷

²⁶ Ibid., p. 119.

²⁷ Ibid., p. 79.

*ratoons - the roots of cane left after harvest, which produced more offshoots of canes in successive years.

Replanting within this period to 1840 was done only when destruction by livestock, neglect or arson took place. Fertilizer was not yet used and only two weedings were necessary per cane crop, so that the planters' only problem was that of labour.

After the final emancipation of slaves in 1838, British Colonial Policy in the form of the Crown Colony Government left the Negro little choice in deciding a future career for himself. The Trinidad planters, in alliance with the British Government prescribed the terms for land settlement. The planters advocated a minimum of 320 acres as the smallest area of Crown Land granted and went on to point out that 640 acres was the optimum size of a sugar plantation. The planters therefore made it quite clear that in their opinion the development of Trinidad's economy was to be based on sugar and on the large sugar plantations. It is in the light of this decision therefore, rather than the planters complaint of Negro laziness, that one must understand the situation which prevailed. The condemnation of the Negroes' attitude to labour as free people is best summed up by the English historian Anthony Trollope, and Thomas Carlyle in his essay entitled "Occasional Discourse on the Nigger Question". Carlyle condemned emancipation as ruining the West Indies and as encouraging the former slaves to idleness, to lie in the sun and to eat pumpkins and yams. He advocated that the Negroes should be whipped back into slavery and kept there.²⁸

²⁸Williams, op. cit., p. 89.

William Sewell, an American, who visited the island in 1859 was one of the few educated persons who understood and appreciated the plight of the negroes.

Sewell also visited Barbados, St. Vincent and Jamaica and everywhere that he went, he found the Negroes were industrious, their housing improved, and their standard of living raised. In his book "The Ordeal of Free Labour in the British West Indies", Sewell summed up his observations as follows.

"I have endeavoured to point out the two paths that lay open to the West Indian Creole after the abolition of slavery. The one was to remain an estate serf and make sugar for the planter; the other was to rent or purchase land, and work for estates, if he pleased, but be socially independent of a master's control. I endeavoured to follow these two classes of people in the paths they pursued - the majority, who have become independent, and the minority, who have remained estate labourers - and I have shown that the condition of the former is infinitely above the condition of the latter. Is this anywhere denied? Can anyone say that it was not the lawful right of these people thus to seek, and, having found, to cherish their independence? Can anyone say that, by doing so, they wronged themselves, the planters, or the government under which they lived. Can anyone say that they are to blame if, by their successful attempts to elevate themselves above the necessitous and precarious career of labour for daily hire, the agricultural field force was weakened, and the production of sugar diminished?

Is it any argument against the industry of the labouring classes of America that a large proportion annually become proprietors, and withdraw from service for daily hire? Yet this is precisely what the West India Creole has done; this is the charge on which he has been arraigned - this is the crime for which he has been condemned.

Divested of such foreign incumbrances as defects of African character, and other similar stuff and nonsense, it is simply a land question, with which race and colour have nothing whatever to do. The same process goes on in the United States, in Canada, in Australia, and in all new countries where land is cheap and plentiful and the population sparse. The labourer soon becomes a proprietor; the ranks of the labouring force are rapidly thinned; and the capitalist is compelled to pay high, it may be extravagant wages. In the West Indies the capitalist refuses to pay high wages; he thinks that the control of the labour market is one of his rights. He imagines, and upon what ground I cannot comprehend, that farming in these colonies should yield much larger profits than farming anywhere else. He calls it planting, and fancies that there ought to be a wide social distinction between the man who grows cane or cotton and the man who grows potatoes and parsnips. God save the mark! Does anyone dream that if West India planters stuck to their business like English farmers, and possessed one half of their practical ability and industry, the agricultural and commercial interests of the islands would have ever suffered from emancipation? The profits of sugar-

cultivation, according to the planter's creed, must be large enough to yield the proprietor, though an absentee, a comfortable income, and pay large salaries besides to overseers and attorneys; otherwise estates are abandoned, and the sugar interest is ruined. These expectations might have been realized in the days of the old monopoly; they certainly are not realized now, and never can be realized again, unless the British people recede from their principles of free trade and free labour. If labour in the West Indies is high - so high that sometimes the planter cannot afford to pay the price demanded - he is not worse off than the capitalist in all new countries.'

Sewell was aware of the planters problems and states:²⁹

"Unlike other Caribbean islands the seasons in Trinidad are purely tropical, divided into the rainy and the dry. The latter only lasts 5 months, and if the planter has not completed his crop operations by the first of June, his loss is certain and irremediable. For this reason steady labour in Trinidad during crop season was and is of paramount importance and the planters had every reason to be alarmed that, in this island above all others, the effect of emancipation would be to deprive them of that continuous labour with which they were so scantily supplied. It was the planters who had dictated the future course of the island, and it was now their turn to reap the harvests of their folly."

The Negro was now free to dictate the price for his labour, the conditions under which he wanted to work, including the number of days per week. The majority of them either bought their own land or squatted on Crown Lands near the major areas of settlement.

The rate of wages for work on sugar estates was fixed immediately after emancipation at 30 cents (15 pence sterling) per task, with some allowances. The task was considered to be an area 60 foot square and it was possible to weed such an area in $3\frac{1}{2}$ -4 hours. Most of the emancipated slaves were content to work 3-4 days per week completing only 1 task in a day. The allowances granted upon completion of one task was half-a-pound of cod fish plus one or two glasses of rum. The planters, in an effort to maintain their output from days of slavery, were willing to offer any incentive to the labourers to have their work done.

As a result, prices increased for labour. Most out-of-crop work such as weeding and trenching was done by the task. In "crop-time" working by the task was limited to cutting canes, carting and crooking* them to the mill.

Within two years of emancipation wages increased by an average of 20 cents per task. In South Naparima prices were generally at 50 cents per task for weeding but fluctuated up to 80 cents depending on the condition of the cane. The allow-

*-carrying canes on the backs of mules.

ance of half-a pound of cod fish and one or two glasses of rum were worth an additional 10 cents per task making a wage of 60 cents per task. In Naparima medicine and medical attendance were also given free so that a labourer working two tasks per day could clear \$1.20.³⁰

During the crop season ordinary labour about the mill and boiling house earned 50-60 cents per day with an increase in allowance in the form of pork, flour and biscuits. They were given to the labourers in the following proportions: 2 biscuits per day to the boiler men, firemen, megasse and cane carriers, carters and crook boys, with 2 lbs of pork and 2 quarts of flour per week to the headman.³¹

This additional allowance was worth 30 cents per day making an earning of 80 cents a day. Many people preferred an 80 cent wage to the \$1.20 possible in the field because of lighter work required around the boiling house.

Wages varied from place to place depending on the distance from the towns, the "popularity" of the district in terms of land owners' attitudes, and the difficulty of the terrain to be planted and cleaned. These fluctuations were not very great but generally wages were higher in the north of the island because of the flatness of the terrain and consequent problems of water and weeds.

A result of the shortage of labour was an annual mig-

³⁰Burnley, op. cit., p. 80.

³¹Ibid.

gratory labour supply from Venezuela. Workers there earned 40-50 cents per day and were attracted by the higher wages in North Trinidad and the better working conditions. No figures are available on the extent of this migration save that it was "considerable" in crop time and increasing every year.³² However, this was still not large enough to upset the wage scale and neither did it solve Trinidad's labour supply problems. On the road to Arima, three new large villages were established despite the price of £133 sterling per acre. (\$320-\$640 per acre fluctuation). These lots were on the main public road and lots behind them were sold at £6.10 shilling per acre, and prices decreased as lots established further away from the main road.

Land in the Naparimas sold at even more extravagant prices of £200 to £416 sterling per acre. A planter, in selling some of his land for the establishment of a village received an average of \$116 (£24.3.4d) for 12 lots each 50 foot by 100 foot deep fronting the public road. The lots immediately behind them 70 foot by 100 foot, sold at \$110 each (£22.18.6d) This amounts to more than \$1000 (£208.6.8d) per acre.³³

Despite the availability of land in the Naparimas, the buyers preferred paying these prices to be near to the port and San-Fernando. The north-south roads also provided easy communication and a ready supply of necessities and gossip from the town and their neighbours. Squatters

³²Ibid., p. 85-86.

³³Ibid., p. 102.

tended to congregate principally in the vicinity of the towns and cultivated district. As early as October 6th, 1838, a proclamation was issued by the Trinidad Government prohibiting squatting on Crown Lands, but these rules were never enforced.

Squatters around Port-of-Spain and San Fernando found a profitable market in these towns for Guinea-grass (Panicum maximum Jacq) and charcoal, the former as animal fodder and the latter being always in demand for cooking purposes. The best example of squatting was a settlement of over 500 squatters on an abandoned sugar estate in South Trinidad, as well as on the Crown Lands around. This area of present day Gasparillo is near to San-Fernando so that the squatters could serve as a temporary source of labour supply on the sugar estates as well as sell charcoal to San-Fernando residents. Squatting was not more prevalent in the south because of illicit slaves, but rather because of the greater number of former slaves in this area, who preferred to remain in their former home areas. In a period of 10-12 years they cleared completely, very valuable trees within an area of 480 acres of land, to supply San Fernando with her charcoal needs. Absolutely no concern was paid to the problems of erosion that resulted and no government action was taken.

Freed slaves were now content to grow provisions* for their own use, and there was no surplus to sell to the towns' residents. These were the people who prior to emancipation

*provisions or ground provisions - local term for vegetables usually grown on a small farm and includes such articles as yams, cassava, ochroes, etc.

provided the labour for the production of these surplus provisions. The 6,313 acres of land under provision cultivation were so poorly managed that a bustling import trade developed with Venezuela, Grenada and St. Vincent. Slaves now considered themselves to be self sufficient, so that the supply of their labour to the sugar cane estates was now dictated by their need for extra money, and sugar estates suffered from an undependable labour supply.

The deputy harbour master in 1840, testifying before the Burnley commission gave the following information:

"...increase in imported vegetables and provisions great in the past few years, especially since 1838. For instance the quantity of plantains imported in 1825 into the harbour of Port-of-Spain amounted to only 154,700 bunches, in 1835 it increased to 2,026,700; and, in 1840 to 4,332,900 bunches. Hogs during the same period have increased from 1,095 to 4,913. Fowls, from 86 dozens to 810 dozens. Turkeys from 87 to 1,018 pairs. The import of dried peas, goats, eggs and other minor articles has all increased about the same proportion; and the number of horned cattle, which was only 734 in 1825, amounted to 4,320 in 1840, having nearly doubled since 1835."³⁴

Yams were imported from Grenada and St. Vincent, while corn, dried peas and flour were imported from the United States. A thriving contraband trade also developed with the Spanish Main, a continuation of a practice started since Spanish times.

³⁴Ibid., p. 122.

The Trinidad Government was unwilling to enforce any strict measures against this trade since the population had to be fed and no alternatives existed.

Meanwhile planters were making repeated appeals to the Mother Country for help in solving her labour problem. The British Parliament itself full of members who owned estates in the West Indies and who had gained by compensation paid for slaves, was definitely on the side of the planter. A committee of the House of Commons on the West Indies colonies arrived at the following resolutions on July 25, 1842:

1. THAT the great act emancipating the Slaves in the West Indian Colonies has been productive, as regards the character and condition of the Negro Population, of the most favourable and gratifying results.

2. THAT the improvement in the character of the Negro in every Colony into the state of which this Committee has had time to extend inquiry, is proved by abundant testimony of an increased and increasing desire for religious and general instruction; a growing disposition to take upon themselves the obligations of marriage, and to fulfil the duties of domestic life; improved morals; rapid advance in civilisation, and increased sense of the value of property and independent station.

3. THAT, unhappily, there has occurred, simultaneously with this amendment in the condition of the Negroes, a very great diminution in the staple productions of the West Indies, to such an extent as to have caused serious, and, in some cases, ruinous injury to the proprietors of estates in those Colonies.

4. THAT while this distress has been felt to a much less extent in some of the smaller and more populous Islands, it has been so great in the larger Colonies of Jamaica, British Guiana, and Trinidad, as to have caused many estates, hitherto prosperous and productive, to be cultivated for the last two or three years at considerable loss, and others to be abandoned.

5. THAT the principal causes of this diminished production and consequent distress are, the great difficulty which has been experienced by the Planters in obtaining steady and continuous labour, and the high rate of remuneration which they give for the broken and indifferent work which they are able to procure.

6. THAT the diminished supply of labour is caused partly by the fact that some of the former Slaves have betaken themselves to other occupations more profitable than field labour; but the more general cause is, that the labourers are enabled to live in comfort and to acquire wealth without, for the most part, labouring on the estates of the planters for more than three or four days in a week, and from five to seven hours in a day; so that they have no sufficient stimulus to perform an adequate amount of work.

7. THAT this state of things arises partly from the high wages which the insufficiency of the supply of labour, and their competition with each other, naturally compel the Planters to pay; but is principally to be attributed to the easy terms upon which the use of land has been obtainable by Negroes.

8. THAT many of the former Slaves have been enabled to purchase land, and the labourers generally are allowed to occupy provision grounds subject to no rent, or to a very low one; and in these fertile countries, the land they thus hold as owners or occupiers not only yields them an ample supply of food, but in many cases a considerable overplus in money, altogether independent of, and in addition to, the high money wages which they receive.

9. THAT the cheapness of land has thus been the main cause of the difficulties which have been experienced; and that this cheapness is the natural result of the excess of fertile land beyond the wants of the existing population.

10. THAT in considering the anxious question of what practical remedies are best calculated to check the increasing depreciation of West Indian property, it therefore appears that much might be effected by judicious arrangements on the part of Planters themselves, for their own general advantage, and by moderate and prudent changes in the system which they have hitherto adopted.

11. THAT one obvious and most desirable mode of endeavouring to compensate for this diminished supply of labour, is to promote the immigration of a fresh labouring population, to such an extent as to create competition for employment.

12. THAT for the better attainment of that object, as well as to secure the full rights and comforts of the immigrants as freemen, it is desirable that such immigration should be con-

ducted under the authority, inspection, and control of responsible public officers.

13. THAT it is also a serious question, whether it is not required by a due regard for the just rights and interests of the West Indian Proprietors, and the ultimate welfare of the Negroes themselves, more especially in consideration of the large addition to the labouring population which it is hoped may soon be effected by immigration, that the laws which regulate the relations between employers and labourers in the different Colonies, should undergo early and careful revision by their respective Legislatures.

The die was therefore cast. If emancipated slaves could not work on estates under terms prescribed by the British, then a new Population was to be brought in. Sugar was to remain king regardless of the methods employed, and the emancipated slave was left to fend for himself.

The post 1845 period marks a new system of Labour supply in the region and ensured the continued reign of sugar in Trinidad to the end of the century. It also introduced an Asian element into the native population, which until today, remains the main agricultural group of the island.

CHAPTER FOUR

1845-1897

The Labour Problem:

Throughout the Caribbean sugar colonies, the labour supply continued to be of prime concern to the planter in the second half of the nineteenth century. Despite the introduction of Indian indentured labour to Trinidad, the industry lacked for labour.¹ This shortage was due to the Indians' habit of buying Crown Land immediately upon termination of their indentureship, and later in the century, their engagement in "small" farming.

In an effort to give the Indian immigrants to Trinidad a fair deal, a series of laws was formulated by the British government. These laws, first introduced in 1844, related to terms of contract, treatment of indentured labour, and the use of this labour after indentureship. These laws were modified or added to as time went by, while the government learned by trial and error. They were finally consolidated and amended by an Ordinance of July 17, 1899. It is necessary to quote much of this lengthy Ordinance (52 pages, 276 paragraphs) since it dealt specifically with indentured labour on sugar cane

¹Beachey, R.W., The British West Indies Sugar Industry in the late Nineteenth Century, Oxford, Basil Blackwell, 1957, p. 103.

estates. This ordinance is summarised by Williams as follows.

Part I of the Ordinance deals with the Immigration Department. At the head of this Department was an official styled the Protector of Immigrants, assisted by the Sub-Protector of Immigrants. The Ordinance provided for Inspectors, Assistant Inspectors, Clerks, and Interpreters attached to the Immigration Department, and paid cash salaries and allowances as were approved by the Legislative Council. The Medical Officers of the Government, headed by the Surgeon General, were authorised to visit any plantation on which there were immigrants, inspect the dwellings of the immigrants, the yards and grounds surrounding them, the hospital and all books and registers kept in connection with the hospital. The Protector of Immigrants was given wide powers to visit all plantations on which there were indentured immigrants, to enquire into all complaints of and by immigrants, to conduct investigations and to institute prosecutions. The Ordinance also empowered the Government to appoint Immigration Agents to superintend the immigration of workers from any part or place from which immigrants might be introduced in Trinidad.

Part III of the Ordinance deals with the arrival and allotment of indentured Indians. On arrival in Port-of-Spain, ship and immigrants were visited by the Protector, assisted by a Medical Officer. The Protector was given power to allot any immigrant under the Ordinance for domestic or other service when all the approved applications for immigrants had been complied with, on the understanding that husbands were not to be

separated from wives, nor minors and infants from their parents or natural guardians.

Part V of the Ordinance deals with the dwellings of immigrants. No immigrants allotted to a plantation were to be delivered to the employer until the employer had furnished the Protector with any information required by him with regard to the dwellings to be assigned to such immigrants. The employer was required at all times to provide an immigrant under indenture upon his plantation with a suitable dwelling and to keep such dwelling in sufficient repair with its roofs water tight, and to keep the yard and grounds or a sufficient space around well drained, and the drains clean and in good order, and the yard and grounds free from bush, weeds and rubbish of every description. No dwelling which, in the opinion of the Surgeon General, was unfit for habitation, was to be assigned to any indentured immigrant; and except with the special permission of the Surgeon General, no adult was to be allowed less than 50 feet of superficial space, and an apartment of not less than 120 feet of superficial space was not to be assigned to more than three single men or to more than one man and one woman with not more than two children.

Part VI of the Ordinance specified the rations that the employer was required to provide for his immigrants during the first twelve months after they were assigned to him, and prescribed that not more than six cents was to be deducted from the immigrant's wages for each day's earnings.

Part VII deals with hospitals, requiring every plan-

tation to which immigrants were assigned to maintain a hospital at the rate of at least four beds for not more than 40 immigrants, 5 beds for from 40 to 70, and 10 beds for from 70 to 100, with an additional 7 per cent for every additional 100 immigrants after the first 100. Completely separate accommodation was to be afforded for male and female immigrants. The Ordinance empowered the Protector and the Surgeon General to make regulations for the management of hospitals and to specify the furniture, medicine, clothes and appliances which were to be kept in each hospital. Any employer who refused or neglected to send to hospital any indentured immigrant who was in need of medical care, or who refused or neglected to provide him with the medicines, medical comforts and diet which were ordered for him, was liable to a penalty not exceeding \$24. On the other hand, any indentured immigrant who, having entered the hospital, was found beyond the limits of the hospital before his discharge, or who refused or neglected to go to the hospital when ordered by his employer to do so, or who contravened the hospital regulations, or behaved himself in a disorderly or refractory manner while he was in hospital was liable to a penalty not exceeding \$4.80 or to imprisonment for any term not exceeding 14 days.

Part VIII of the Ordinance, the core of the Ordinance, deals with labour and wages. The Ordinance required the employer to provide every indentured immigrant with sufficient work for a full day's labour every day of the week except Sundays and public holidays: any immigrant willing and able

to work, who was not provided with work on any working day, was entitled to his full day's wage for every day on which work was not so provided. The working day was fixed at 9 hours, with half-hour daily for eating and resting after $4\frac{1}{2}$ hours, this half-hour being included in the 9 hours. The legal daily wage was fixed by the Ordinance at not less than 25 cents for an able-bodied adult immigrant, and not less than 16 cents if he was indentured as other than an able-bodied adult immigrant.

Any indentured immigrant who, without reasonable excuse, refused or neglected to amend any work which was not accepted because it had been improperly done, was liable on the first conviction to a maximum penalty of \$4.80 or 14 days imprisonment, and on a second or other subsequent conviction, to a maximum penalty of \$9.60 or one month's imprisonment. Every indentured immigrant who was found drunk in or about the plantation buildings, or while he was on the job, or during any time on which he was required to be at work, or who was guilty of any fraud or wilful deception in the performance of his work, or who used abusive or insulting words or gestures to his employer or to any person in authority, or who was guilty of wilful disobedience to any lawful or reasonable order, was liable to a maximum penalty of \$4.80 or 14 days imprisonment. Every indentured immigrant who used threatening words or gestures to his employer or to any person in authority, or who by negligence or carelessness endangered or damaged the property of his employer, or who hindered or molested any other immigrant in the performance of his work, or who persuaded or

sought to persuade any other immigrant to refuse or absent himself or to desist from work, was liable to a maximum penalty of \$24 or two months imprisonment.

Part IX of the Ordinance deals with leave and desertion. Every indentured immigrant was bound to reside on the plantation on which he was indentured. Any immigrant found on a public highway or on any land or in any house not the property of his employer, or in any ship or boat within the waters of the island, could be stopped without warrant by the Protector of Immigrants or any person authorised in writing by him, or by any Estate Constable attached to the plantation to which the immigrant was indentured, or by the employer of the immigrant or his manager or overseer, and if the immigrant failed to produce a certificate of industrial residence or of exemption from labour or a ticket of leave, he could be arrested and taken to the nearest Police Station and detained there until he appeared before a Justice of the Peace. Every indentured immigrant who absented himself without leave from the plantation either when he was required to be at work or in such manner or in such time as to constitute a breach of the obligation of residence, was liable, if a male, to a maximum fine of \$9.60, and if a female, to a maximum fine of \$4.80. Every able-bodied indentured immigrant who had earned \$1.25 per week during the two consecutive weeks, was entitled to be provided by his employer with a free pass for as many days as he required for leave of absence, provided that such leave of absence was not to exceed seven days at any one time or 26 days in any

one year. Any indentured immigrant who absented himself for three days without leave from the plantation was deemed a deserter, and the manager could thereupon apply to the Magistrate for a warrant for his apprehension. Every indentured immigrant who deserted his plantation was liable to a maximum penalty of either \$24 or two months imprisonment or to both such penalty and imprisonment. Any indentured male immigrant absent from work without lawful excuse for twelve days in any one month or in any two consecutive months was deemed a habitual idler and was liable to imprisonment for a maximum period of three months.

It is questionable whether this system of labour and the terms under which it existed, could be really termed "free labour". The Ordinance gives little leeway to the indentured soul and in actual practice it was often found that the Protector of Immigrants was ineffective.

Housing conditions were poor and the "barrack type" house offered little privacy and forced families into one room, regardless of sex or age. The barrack is a long wooden building roughly 12 feet wide and divided by partitions into 8 or 10 small rooms.² Partitions never reached the roof which was made of galvanized iron, without any ceiling, and therefore very hot by day and cold by night. Furthermore, no facilities were provided for cooking or for ablutions. As a

² Williams, E., History of the People of Trinidad and Tobago, London: Andre Deutsch, 1964, pp. 102-104.

result, the estates' population was riddled by the diseases of malaria, ankylostomiasis, anaemia, parasites and ground itch. Williams finds much of this disease directly traceable to the barrack system.

Malaria and ankylostomiasis were the chief scourges. Of the 24,000 cases of sickness treated in 1911, in all of Trinidad, 8,400 were malarial. There were over 7000 cases of treatment for the other diseases mentioned, and most of all of the diseases were found on sugar plantations. The proportion of malaria cases to population was 92 on sugar plantations, 56 on cocoa estates; the combined proportion of ankylostomiasis, anaemia, parasites, and the ground itch was 33 on sugar plantations, 28 on cocoa estates; the proportion of skin diseases was 43 on sugar plantations, 17 on cocoa estates. The death rate on sugar plantations was half as much higher than the rate on cocoa estates. The venereal disease rate was much higher also on the sugar plantation but the proportion of dysentery cases lower than on the cocoa estate.

Inefficient labour resulted and in 1895 the Surgeon General of the Colony stated a loss of 165,816 man days of labour or about £8,000. The manager of the Usine St. Madeline Sugar Co. in Trinidad, on the basis of the records of 1,996 indentured immigrants for the years 1892-1895, estimated that only 63% of the 280 contract days were worked; one day in every three was lost to the plantations. Eleven percent of the time was lost through sickness.³

³Report of the West Indies Royal Commission, Appendix C., Vol. II, Part 4, London: H.M. Stationary Office, 1897.

Indentured labour proved inefficient in two major ways. The first is the case of sickness mentioned before. To this may be added desertion. In the second place, indentured immigration encouraged inefficiency on the part of the planter. Economic improvements were rejected in favour of cheap manual labour living in a condition of semi-servitude. As a result, technological progress in both factory and field were evenly restricted. The great leaps forward made in beet sugar cultivation and technology in Europe, and the corresponding indifference of the sugar planters in the West Indies, were responsible for the grave sugar crises that were to follow in the West Indies in the late nineteenth century.

Up to 1900, approximately 110,000 Indians⁴ were introduced to Trinidad, of whom some 18,000 had returned to India. Many of those who remained became land owners and in most cases cane farmers. Sugar proprietors objected to peasant farming as attracting labour away from the sugar estates. By 1896, in one district in Trinidad the sugar production was stated to have been reduced by 25% as result of labourers turning to small farming.⁵ This objection was not legally accepted and by 1902 ~~peasant~~ cane farmers were contributing ~~over~~ half the cane produced in the colony. Williams sees the emergence of the small farmer class as the Indians' outstanding contribution to Trinidad, in the social

⁴Beachey, op. cit., p. 104.

⁵Ibid., p. 116.

sense.⁶ That the Indians became small farmers and growers was partly a question of finance. Numerous plantations ceased to exist because they could not afford rising costs, and the Indians, who were the agricultural population, took over the growing of sugar cane in small plots of land.

Sugar Beet Competition

The sugar industry in Trinidad and the rest of the West Indies was immediately vulnerable in two directions (1) from Cuba, with its more fertile lands and advanced technology (2) from countries producing beet sugar, which too, were more advanced in science and technology, both in field and factory, despite the smaller acre yield of the beet. "The combination of competition from these 2 areas, Cuban cane and European (chiefly German) beet, associated with the home policy of the British Government, brought the West Indies to the verge of total collapse in 1897".⁷ This policy of free trade is discussed later. The dominance of Cuba as a cane sugar producer in the West Indies is easily understandable. American capital investment and the reliability of the American market were factors which accentuated Cuba's advantages of more fertile soils, larger and better organized plantations, and more advanced factory technology.

The success of beet sugar on the European market was due to different factors. The cultivation of beetroot in

⁶ Williams, op. cit., p. 119.

⁷ Ibid., p. 151.

Europe was first encouraged by Napoleon as one of his plans to injure the commerce of England and to make France independent of imported sugar. With the French government tax imposed on beet sugar in 1838, the system of bounties was introduced. The refiner of raw beet sugar was taxed on the supposition that the refined sugar would give a certain % yield (example 80% of raw sugar). If however there was an excess of refined sugar above this taxable percentage, it was tax free. The system of analyzing raw sugar was defective in that sucrose content was judged by shades of colour. This more "attractive" looking sugar soon became more popular with the English consumer. In fact, the history of West Indies sugar to 1903, is the history of conflict between cane sugar and bounty fed European beet sugar.

The deliberate policy of European governments in encouraging sugar beet cultivation was in direct contrast to the English Government's policy to her West Indies islands. The free trade policy of Britain was responsible for her surrender of protectionist duties on sugar in 1852, and thereafter Britain's interest was to buy in the cheapest market. The following table indicates the consequences of that policy.⁸

Year	Br. Imports (Tons)	% Beet	% Br. Cane	% Foreign Cane
1853	1,476,714	14	17	69
1863	2,005,637	23	17	60
1873	2,956,152	38	12	50
1882	3,799,284	47	13	40
1892	1,526,000	75	10	15

The European beet sugar industry represented the triumph of science and technology. It is wrong to assume however that

⁸ Ibid., p. 157.

it was scientific progress which was finally responsible for the decline of the West Indies market. Rather it was Britain's desire for cheap sugar and her resulting free trade policy that marked the final collapse. The West Indies colonies were good so long as their produce could compete on the world market. The Mother Country's trade policies were distinctly oriented towards her own enrichment, regardless of the evils which did accrue in her colonies.

Beet cultivation utilized not only the deep plough, but separated the agricultural and industrial phases, unlike the West Indies sugar counterpart. Beet sugar refining provided winterjobs and enormous quantities of cattle feed. Concentration on better varietal types was responsible for the reduction in quantity of roots needed to make one ton of sugar, from 18 tons in 1836 to 11 tons 1868.⁹ Meanwhile in the West Indies most of the cane was still of the noble or otaheite variety, grown under poor crop rotation systems and poor soils. The man and the hoe were still used in preference to the plough, and the thought of central factories was anathema to the sugar proprietor who still envisaged himself as lord of his own manor.

German beet production made equally startling advances in the factories. In 1836 Germany's beet was produced in 122 factories with an average output of 12 tons per factory. By 1896 her record production of 1,821,223 tons was produced in 397 factories at an average of 4,587 tons per factory.¹⁰

⁹Ibid., p. 155.

¹⁰Ibid.

The average output per factory in Trinidad was slightly more than $\frac{1}{4}$ of the German average, and the process of diffusion of ideas in factories in the West Indies was now being introduced. Despite the combination of science, technology and capital in beet sugar production, cane still enjoyed a greater sucrose yield per acre. The commissioner of Agriculture of the U.S.A. found the cane yield per acre ratio of cane sugar to beet sugar to be 18:10. According to the West Indies Royal Commission of 1897, the yield per acre was 18 tons of cane in Trinidad and Martinique as compared with 10.7 tons of beet in France and 12.85 tons in Germany.¹¹

But Superior science and technology discounted natural advantages. The extraction of sugar was $12\frac{1}{2}\%$ in Germany, nearly 11% in France, $9\frac{1}{2}\%$ in Trinidad, 9% in British Guiana and $7\frac{1}{4}\%$ in Martinique. The cost of manufacturing one ton of sugar was as follows:¹²

Beet:	Germany (1894)	\$49.60
	France (1894)	\$50.70
Cane:	Trinidad (1896)	\$48.70
	British Guiana (1895)	\$52.48
	Martinique (1893)	\$76.32
	Queensland (1893)	\$41.90
	Egypt (1893)	\$44.16

Cane was thus cheaper to manufacture than beet, except in the British and French West Indies which were allowed to compete on a bounty fed market, without any efforts of the

¹¹West Indies Royal Commission, op. cit., p. 206.

¹²Ibid.

Mother Governments to protect and improve their colonies. In 1884 it was estimated that Britain's annual gain from the bounty system was £2,750,000 and that in 13 years preceeding 1883, Britain had gained £28 million. British per capita consumption of sugar increased from 68.7 lbs. in 1890 to 83.7 in 1900. The price of ordinary refined cane sugar fell from 28 shillings per cwt. in 1882 to 13/- in 1896. Unrefined beet fell from 21/- to 10/-; unrefined cane from 21/- to nearly 11/- per cwt. Trinidad was thus left either to find a new market or fend for herself in the world market.

Sugar Technology:

Up to the late nineteenth century most sugar estates in the West Indies were still making muscovado sugar. The main feature of this method of refining was its wastefulness and slovenliness. Sugar cane contains 87% of its weight in juice but the mills producing muscovado sugar were able to extract only 50-60% of this juice.¹³ The overall losses were therefore enormous.

Defective crushing was due to the poor type of mill producing muscovado sugar. The mill was a simple construction of a top wooden roller which pressed on two bottom horizontal rollers which were bolted securely. When the often over ripe Bourbon or Otaheite canes were being crushed, being unusually hard, they caused breakages of the rollers. In Trinidad new mills were gradually introduced after 1865. They had hydraulic

¹³

Beachey, R., "Sugar Technology in the British West Indies in the late Nineteenth Century", Caribbean Historical Review, Nos. III-IV, Trinidad: Government Printing Office, Dec. 1954, p. 170.

Table 12 -QUANTITY, VALUE, and PERCENTAGE of each CLASS of SUGAR exported to PRINCIPAL COUNTRIES, 1891-96.

	Description.	United Kingdom.			United States.			British North America.			Other Countries.			Total.		
		Quantity.	Per Cent.	Value.	Quantity.	Per Cent.	Value.	Quantity.	Per Cent.	Value.	Quantity.	Per Cent.	Value.	Quantity.	Per Cent.	Value.
1891 {	Muscovado -	Lbs.	1.3	£ 2,884	Lbs.	98.5	£ 299,858	Lbs.	0.2	£ 1,428	Lbs.		£ 69	Lbs.		£ 234,239
	Centrifugal -	532,672	24.8	35,346	16,334,303	75.2	108,002	74,202		—	15,180		—	41,758,387		143,348
	Vacuum Pan -	5,395,861	60.5	172,269	13,000,932	39.4	112,602	10,279		73	35,186	0.1	258	38,092,820		285,202
	Total -	23,046,403														
1892 {	Muscovado -	Lbs.	28.5	£ 210,499	72,491,588	71.3	£ 450,462	84,481	0.1	£ 1,501	50,366	0.1	327	101,601,371		£ 662,789
	Centrifugal -	306,140		1,582	31,671,434		159,364	616,797		3,006	32,761		168	32,627,132		164,120
	Vacuum Pan -	4,587,036		26,163	15,410,355		91,800	124,340		754	—		—	20,121,731		118,717
	Total -	37,757,972		256,096	19,969,465		135,741	73,930		465	32,924		203	57,834,291		392,505
1893 {	Muscovado -	Lbs.	38.6	£ 283,841	67,031,254	60.6	£ 386,905	815,067	0.7	£ 4,225	65,685	0.1	371	110,583,134		£ 675,342
	Centrifugal -	257,820		1,362	24,392,682		155,042	106,675		645	41,933		247	24,799,130		157,296
	Vacuum Pan -	3,729,698		28,037	10,918,594		80,250	81,525		585	1,344		10	14,761,161		491,759
	Total -	37,393,747		301,506	24,017,457		188,876	166,000		1,356	2,866		21	61,580,070		108,882
1894 {	Muscovado -	Lbs.	40.9	£ 330,905	59,358,733	58.7	£ 424,168	354,220	0.4	£ 2,586	46,143		278	101,140,561		£ 757,937
	Centrifugal -	324,460		1,352	19,039,823		89,621	972,109		5,319	23,278		97	20,359,670		96,389
	Vacuum Pan -	15,804,478		87,333	11,624,852		64,092	826,180		4,930	154,683		1,257	28,410,193		343,989
	Total -	45,688,907		277,410	10,370,078		65,332	198,706		1,196	8,852		51	56,216,543		157,632
1895 {	Muscovado -	Lbs.	58.8	£ 366,115	41,034,752	39.1	£ 219,045	1,996,995	1.9	£ 11,445	186,813	0.2	1,405	104,986,406		£ 598,010
	Centrifugal -	22,674		78	11,975,268		44,264	227,237		852	250,152		807	12,475,331		46,002
	Vacuum Pan -	17,016,105		81,869	16,328,272		83,547	—		—	59,576		306	33,603,953		165,722
	Total -	48,668,431		245,464	26,939,811		135,793	190,204		976	476,025		2,458	76,274,471		384,691
1896 {	Muscovado -	Lbs.	53.7	£ 327,412	55,443,351	45.3	£ 263,604	417,441	0.3	£ 1,828	785,753	0.7	3,571	122,353,755		£ 596,415
	Centrifugal -	22,674		78	11,975,268		44,264	227,237		852	250,152		807	12,475,331		46,002
	Vacuum Pan -	17,016,105		81,869	16,328,272		83,547	—		—	59,576		306	33,603,953		165,722
	Total -	48,668,431		245,464	26,939,811		135,793	190,204		976	476,025		2,458	76,274,471		384,691
1896 {	Muscovado -	Lbs.	60.4	£ 432,398	45,838,865	38.1	£ 257,385	725,706	0.6	£ 3,411	1,209,211	1.1	7,153	120,562,942		£ 700,347
	Centrifugal -	187,016		690	7,893,410		32,569	516,120		2,136	27,167		114	8,623,713		35,509
	Vacuum Pan -	34,798,490		206,271	14,375,051		84,685	—		—	363,822		2,221	49,537,363		293,177
	Total -	37,803,654		225,437	23,570,404		140,131	209,586		1,275	818,222		4,818	62,401,866		371,661

attachments giving equal compression to large or small feeds. An improvement of 10% extraction in juice resulted. It was not until the 1890's that muscovado sugar finally took a third place to Vacuum Pan and Centrifugally refined sugar (Table 12). Up to this time the defective mills producing muscovado sugar were faced with growing competition from steam mills which however, were still the exception up to 1884.

On the muscovado estates, the different stages in the refining of the sugar were left solely to the discretion and experience of the workers. No thermometers were used and lime additions* were made by guess without any tests being made.¹⁴ Large quantities of molasses remained due to the inability of the boiler technicians to prevent inversion** and much of the cane juice was burnt on the coppers walls. Sugar buyers in England naturally complained of the dirty West Indies sugar and expressed a preference for the clean beet sugar.

What was needed in lieu of the copper wall was an appliance which would prevent rapid boiling at a lower temperature and thus avoid the inversion and burning so common with the open pan system. "The solution to this difficulty involved perhaps the greatest advance made in sugar manufacturing".¹⁵

¹⁴ Ibid., p. 174.

¹⁵ Ibid., p. 176.

*lime used as a flux, thus separating the impurities from the juice.

**--the change of sugar to glucose-fructose. A simple mixture of these 2 monosaccharides is referred to as invert sugar and is more liable in cane than in beet.

The Vacuum Pan

The vacuum pan method was the answer. This method, controlled pressure, and permitted the gradual lowering of temperature of the boiling point of the juice. Invented in 1813 it was introduced into Trinidad's larger estates in the 1870's. The chief obstacle to its widespread adoption was the cost. In 1878 it was calculated that to equip a sugar estate manufacturing 1,000 hogsheads of Vacuum Pan sugar involved a capital outlay of between £40,000-£50,000.

The acme of the vacuum pan method came in the late 1880's when the "triple effect" was developed. Three pans were now used instead of one. Vapour from pan one (I) was conducted successively to pans II and then III. The pans were so attached that under pressure the boiling point was reached at successively lower temperatures in the second and third pans. Finally in the complete vacuum, sugar boiled till granulation set in. This principle is still used today.

The operation following evaporation and concentration of cane juice is known as "striking".¹⁶ In the open pan system the syrup called "strike" or "skip" was taken from the "tayche" at temperatures between 234 degrees to 238 degrees F. and was usually removed by ladling into a gutter and then conveyed to coolers. Sometimes all of the strike was removed at once by a copper vessel with a valve in the bottom, which

¹⁶Beachey, R., The British West Indies Sugar Industry in the late Nineteenth Century, Oxford: Basil Blackwell, 1957, p. 70.

was made to fit inside the tayche and lowered by a crane. Usually the strike left a portion adhering to the tayche in the form of caramel which increased the colour and otherwise injured the succeeding strike.¹⁷

When the striking operation was completed, the "strike" was conveyed to coolers or wooden trays which were 12" - 14" deep, and usually capable of containing $\frac{1}{2}$ -1 hogshead of sugar. The coolers were placed in the part of the boiling house most exposed to the air and at a convenient distance from the coppers. After remaining in the coolers until sufficiently solid, the sugar was dug up with pickaxes and shovels and carried in pails to the hogsheads, into which it was thrown regardless of temperature, in an effort to make room for another "strike". Often, sugar that would not crystallize in cooling, would drain off as molasses, so that hogsheads always contained different grades of sugar.

The improvement in the drainage of molasses came with the invention of the centrifugal. This was a container which when revolved rapidly, threw off the liquid from the crystals, the syrup passing through a mesh.¹⁸ Under the old system drainage of molasses took 2 or more weeks, while the centrifugal system allowed drying in a few hours.

With the centrifugal, vacuum pan sugar could be presented to its best advantage, and could also be bagged and handled, unlike the cumbersome and expensive hogshead barrels. Cry-

¹⁷Ibid.

¹⁸Beachey, "Sugar Technology in the British West Indies in the late Nineteenth Century", p. 180.

Table 13 — QUANTITY, VALUE, and PERCENTAGE OF PRINCIPAL NATIVE PRODUCTS and MANUFACTURES EXPORTED to each COUNTRY, 1881-95.

MOLASSES.

Year.	United Kingdom.				United States.				British North America.				French West Indies.				Other Countries.				Total.	
	Quantity.	Per Cent.	Value.	Per Cent.	Quantity.	Per Cent.	Value.	Per Cent.	Quantity.	Per Cent.	Value.	Per Cent.	Quantity.	Per Cent.	Value.	Per Cent.	Quantity.	Per Cent.	Value.	Per Cent.	Quantity.	Value.
1881	Gallons.	8.8	£ 3,529	4.8	2,311	62.7	£ 30,124	—	188,833	13.3	5,763	—	146,904	10.4	4,781	—	1,417,550	—	—	—	Gallons.	£
1882	125,125	—	—	—	—	—	—	—	898,433	—	—	—	188,833	—	—	—	1,417,550	—	—	—	1,417,550	46,903
1883	290	—	9	9.5	7,213	70.2	53,783	—	1,452,226	19.7	14,754	—	406,403	6	472	—	2,067,339	—	—	—	2,067,339	76,236
1884	150,000	7.6	5,626	10.8	8,056	56.1	41,594	—	1,100,311	25.5	18,898	—	505,405	11	114	—	1,982,176	—	—	—	1,982,176	74,066
1885	—	—	—	15.1	7,620	34.1	18,569	—	765,367	49.2	27,511	—	1,082,592	2.7	1,254	—	2,215,650	—	—	—	2,215,650	84,953
1886	356,574	15.1	7,048	8.1	4,056	18.2	8,215	—	450,434	57.1	25,359	—	1,372,760	1.7	707	—	2,416,761	—	—	—	2,416,761	45,385
Total 1881-85	642,219	6.3	16,612	10.1	29,234	46.1	152,289	—	4,652,926	35.1	92,085	—	3,556,043	2.6	7,398	—	10,129,996	—	—	—	10,129,996	297,548
1886	121,100	5.5	2,273	1.2	175	17.9	9,014	—	305,723	68.9	32,702	—	1,330,012	6.5	3,073	—	2,220,233	—	—	—	2,220,233	47,235
1887	396,342	15.6	8,427	32.5	18,871	14.7	7,960	—	374,958	35.3	19,163	—	806,924	1.9	1,754	—	2,512,225	—	—	—	2,512,225	56,155
1888	317,207	16.3	6,816	27.1	12,373	27.3	11,255	—	532,234	16.6	5,763	—	323,060	12.8	5,952	—	1,943,569	—	—	—	1,943,569	42,160
1889	95,250	4.2	2,123	60.7	29,946	22.4	11,139	—	500,328	9.7	4,722	—	217,354	3.1	1,384	—	2,234,724	—	—	—	2,234,724	49,314
1890	174,632	6.2	4,281	17.2	10,832	18.1	11,004	—	368,043	54.2	33,963	—	1,098,729	4.3	2,869	—	2,024,884	—	—	—	2,024,884	63,920
Total 1886-90	1,055,231	9.6	23,897	28.1	72,199	20.1	50,372	—	2,172,286	37.1	96,313	—	4,066,079	5.4	15,021	—	10,970,000	—	—	—	10,970,000	257,302
1891	5,500	4.4	188	3.3	150	29.7	16,322	—	456,034	50.9	26,797	—	781,443	18.7	10,035	—	1,535,415	—	—	—	1,535,415	33,400
1892	54,930	2.9	1,563	—	58	9.2	5,153	—	173,653	80.9	46,776	—	1,532,735	7.1	4,040	—	1,595,773	—	—	—	1,595,773	57,509
1893	160,050	12.8	4,731	5.5	191	4.3	1,656	—	53,392	71.5	27,938	—	894,852	10.9	4,217	—	1,230,963	—	—	—	1,230,963	38,733
1894	11,127	0.9	324	—	5	4.5	2,094	—	56,244	84.2	34,741	—	1,040,780	10.4	4,924	—	1,246,948	—	—	—	1,246,948	42,088
1895	83,298	5.6	2,265	—	—	21.5	9,160	—	322,069	59.1	25,275	—	883,764	13.9	6,842	—	1,493,215	—	—	—	1,493,215	42,551
Total 1891-95	314,995	4.2	9,071	3.9	404	14.3	34,304	—	1,061,392	69.2	161,227	—	5,142,524	12.2	29,067	—	7,427,319	—	—	—	7,427,319	234,463
1896	212,791	15.4	5,911	1.1	42	4.5	1,638	—	62,163	69.3	23,147	—	937,072	10.5	3,760	—	1,373,954	—	—	—	1,373,954	36,488

* The percentages of value in this Table, although in some instances differing slightly from those of Quantity, may, for all practical purposes, be taken as identical therewith.

stals of varying sizes were now obtained and bright coloured sugar could be obtained by centrifuging the massecuite warm.¹⁹ As a result, an almost complete extraction of sugar by the vacuum pan process was possible, and perfect drainage was a distinct advantage.

Molasses

This however, resulted in a loss in the quality of molasses.* Muscovado molasses, containing more sucrose both because of imperfect boiling and drainage, had a steady market and brought higher prices (10 pence per gallon in 1896). Vacuum pan molasses was of lower grade and in 1897 was selling in the colonies for as little as 3 pence per gallon.²⁰

For several years prior to 1897, Trinidad molasses had a market in Martinique (Table 13). Because of protective duties the molasses was worked and sold in France at a profit. Even vacuum pan molasses which sold at $4\frac{1}{2}$ cents per gallon in Trinidad in 1894, was bought at 10 cents per gallon in Martinique. This market ended in 1897 when the Martiniquan government imposed an import duty of \$10.00 per puncheon. Fortunately, another outlet for molasses was the manufacture of Augostura bitters which used rum as its base.

Factory Improvements

In the 1890's an automatic megasse fireman was installed at Usine Ste. Madeline then the largest sugar estate

¹⁹ Ibid.

²⁰ Sugar Commission, 1930, op. cit.

*-molasses, rum and megasse were the chief by products of sugar.

and refinery in Trinidad. Green megasse could now be fed by hopper and a cold rush of air** excluded. A saving of 12 men was possible and added to the general efficiency which resulted with the trend towards central factories. Grindings were now done in 6-8 weeks instead of 5 months and by 1880 it was stated that the average cane juice was pure and richer than it was 20 years previously.²¹

Muscovado estates were reluctant to improve because mortgagees were not willing to lend money without foreseeing quick returns. Up to the mid-1880's small profits were still being made on muscovado estates and proprietors were unwilling to introduce improved methods because of the uncertainty of the future owing to sugar beet competition.

The period 1884-1894 was characterized by reduced costs of production on vacuum pan estates and over this period Usine Ste. Madeline reduced production costs by 50%.²² Larger estates were now the obvious answer and the move towards "centrals" was not started until 1871 in Trinidad. These centrals reduced the cost of production by 50% in the period 1884-94 and it was stated; "All the elements of successful competition with beet sugar are here".²²

Cane Production and Developments in Trinidad - 1845-1896

The period of depression in Trinidad from the 1820's through the 1840's has already been discussed. The takeover

²¹Ibid.

²²West Indies Royal Commission.

²²Beachey, op. cit., p. 142.

**Prior to 1890, it was necessary to open the grates of the boilers to feed fuel into them, and the cooler ambient air succeeded only in lowering the temperature in the boiler.

of French and Spanish interests by the British in the 1820's, plus the shortage of labour after emancipation, were two of the main causes of economic uncertainty at that time. The former problem was soon solved when an English ruling class, with subsequent availability of English capital, was established. The latter problem of labour remained throughout the century.

Added to the planters' woes through emancipation was the 1846 Sugar Duties Act which was Britain's first big step towards establishing sugar as a free trade commodity in England. The final blow came in 1852 when the British West Indies lost their monopoly on the British sugar market when the protectionist duties on sugar were repealed.

The decline in the number of sugar estates was in part a direct result of Britain's free trade policies. Proprietors were now unable to compete successfully on a world market, and the first stages in the amalgamation of estates began. In 1838 there were 210 sugar estates under cultivation and by 1846 this number had diminished to 198.²³ By 1849 there were 157 estates. In three years therefore, after the Sugar Duties Act, 28 estates were abandoned, 28 nearly abandoned or in bad order and 7 changed cultivation or were sold as lots.²⁴

²³Copies of Extracts of Despatches relative to the Condition of the Sugar Growing Colonies, Parliamentary Papers No. 624, Part III, Trinidad, Despatches of Harris, Sept. 6 and Nov. 6, 1849, p. 12 and p. 21.

²⁴Ibid., p. 12.

Table 14
QUANTITY, VALUE, and PERCENTAGE of principal NATIVE PRODUCTS and MANUFACTURES EXPORTED to each COUNTRY, 1831-95.

SUGAR.

Year.	United Kingdom.			United States.			British North America.			Other Countries.			Total.	
	Quantity.	Per Cent.	Value.	Quantity.	Per Cent.	Value.	Quantity.	Per Cent.	Value.	Quantity.	Per Cent.	Value.	Quantity.	Value.
1831 -	Tons.	75.5	£ 519,784	Tons.	18.5	£ 125,869	Tons.	6.	£ 42,405	Tons.	—	£ 95	Tons.	£
1832 -	32,926	—	—	8,037	—	—	2,619	—	—	6	—	—	43,608	688,153
1833 -	37,017	68.	593,366	15,111	27.3	240,669	2,530	4.6	40,162	69	0.1	1,072	55,327	875,269
1834 -	17,698	32.5	306,980	35,673	65.3	559,376	1,102	2.2	19,436	23	—	380	54,496	886,172
1835 -	15,969	26.2	181,996	41,906	68.8	430,978	3,057	5.	29,881	29	—	300	60,961	642,255
1836 -	23,647	37.1	281,783	39,904	62.7	401,451	119	0.2	1,335	9	—	106	63,679	684,675
Total 1831-35	127,857	46.	1,883,009	140,651	51.	1,758,343	9,427	3.	133,219	136	—	1,953	278,071	3,776,524
1836 -	10,779	22.3	147,030	37,654	77.7	398,997	3	—	6	151	—	163	48,449	546,196
1837 -	20,781	31.1	263,047	46,033	68.8	536,709	55	0.1	768	6	—	71	66,875	800,595
1838 -	22,121	40.5	304,935	32,461	59.4	417,834	81	0.1	1,146	20	—	248	54,683	724,163
1839 -	19,710	39.3	359,334	30,196	60.2	510,919	172	0.3	1,745	87	0.2	2,731	50,165	874,729
1840 -	14,382	28.	205,397	35,906	69.8	410,749	428	0.8	4,006	730	1.4	10,663	51,446	630,815
Total 1836-40	87,773	32.3	1,279,743	182,250	67.1	2,275,208	7361	0.3	7,671	8581	0.3	13,876	271,618	3,576,498
1841 -	12,935	28.5	210,499	32,362	71.3	450,462	38	0.1	1,501	23	0.1	327	45,358	662,789
1842 -	19,040	38.6	283,811	29,934	60.6	386,905	364	0.7	4,225	29	0.1	371	49,367	675,342
1843 -	18,474	40.9	330,905	26,499	58.7	424,168	158	0.4	2,586	21	—	278	45,152	757,937
1844 -	27,575	58.8	366,115	18,319	39.1	219,045	892	1.9	11,445	83	0.2	1,405	46,869	598,010
1845 -	29,334	53.7	327,412	24,751	45.3	263,604	186	0.3	1,828	351	0.7	3,571	54,622	596,415
Total 1841-45	107,358	44.5	1,518,772	131,865	54.6	1,744,184	1,638	0.7	21,585	507	0.2	5,952	241,368	3,290,493
1846 -	32,495	60.4	432,398	20,464	38.	257,385	324	.6	3,411	540	1.	7,153	53,823	700,347

* The percentages of Value in this Table, from 1831 to 1889, inclusive, although in some instances differing slightly from those of Quantity, may, for all practical purposes, be taken as identical therewith, and have therefore been omitted. They have, however, been inserted for subsequent years, the three classes of Sugar having been rated separately since 1890.

Land allocated to cane cultivation now covered 100,000 acres of which approximately 40,000 acres were actually under cane. About 220,000 acres in all was in private ownership²⁵ and of the remaining 120,000 acres, 50,000 acres were in cocoa, and 10,000 belonged to small farmers who cultivated provisions. The remainder remained uncultivated.²⁶ Bankruptcies among sugar planters between 1846 and 1849 amounted to £370,000 while only two cocoa proprietors suffered losses amounting to £10,877.²⁷ Harris estimates that of the 193 estates existing in 1847, only 17 were making a profit, and 17 broke even. Of the 17 which earned profits, most of them sold sugar locally without bothering to invest in improvements or expansion necessary to compete on an international market.²⁸

Despite these failures, the cultivation of sugar cane was still slowly spreading. Harris blames this spread on the easy facility of procuring capital from local backers and the comparative ease of procuring labour ~~initially~~, with the introduction of the indenture system. The truth of these assessments was later revealed with the collapse of the small estates and the amalgamation of estates, in an effort to compete internationally with beet sugar. Trinidad and the other West Indies found a temporary relief in the United States market and Trinidad became almost completely dependent on this market (Table 14). The cheaper and better sugar of Santa

²⁵Ibid., p. 84.

²⁶Ibid.

²⁷Ibid., p. 22.

²⁸Bell, K.N. and Morrell, W.T. (eds) Select Documents on Trinidad Colonial Policy 1830-60, Oxford: Clarendon Press, 1928, 610 pages, Sec. V, No. 18, p. 429.

Cruz and Puerto Rico did not help the situation in the earlier years of trade, and between 1838 and 1848, there was a loss of British capital on all sugar estates amounting to £1,000,000.

Choice of Estate Sites

The areas chosen for sugar cane cultivation were still left largely to chance. The richness of the soil was judged by certain indicator species of trees and bushes, and sites were also chosen depending on the distance of the cartage to and from the nearest shipping place. Since each estate had its own mill, factory location was not an important factor in site selection.

Competition in world and domestic sugar markets was unknown, and the economy of time or labour "formed no portion of the planters' philosophy".²⁹ Each estate was a separate and exclusive community governed by "iron despotism" necessary to maintain "a system of slavery".³⁰ The planters' concern was for money and the isolation of property was considered to have its advantages.

Cane Planting Methods and Care

Soil nutrient value was never considered in choosing an estate site, and subsoil drainage was unheard of except at the Orange Grove estate in Tacarigua. Here beds were laid 5 feet apart for efficient surface drainage and were separated

²⁹ De Verteuil, L.A.A., Anderson, A.W., Kernahan, W. and Swift, F.J., Three Essays on the Cultivation of the Sugar Cane in Trinidad with Remarks on the Processes at Present in Use in the Manufacture of Sugar, Port-of-Spain: 'Standard' Office, 1848, 298 pages, from Kernahan and Swift, p. 241.

³⁰ Ibid.

by trenches. In the planting operation holes were 3' long by $2\frac{1}{2}$ ' broad in which two plants, each 18" long were placed. Beds were 20' wide and contained three rows.³¹ Hoes were used to break-up the earth to a depth of 5 inches and cane planting normally commenced in February. Canes used as plants were usually 8-10 months old and 8' long. Five plants could be obtained from each stalk and Kernahan a planter, was able to plant 16 acres from one acre of such plants.

Cane varieties were still chiefly Otaheite, Bourbon and Javanese or Batavia and Otaheite was most widely cultivated. After planting, cane sprouts appeared in 2-3 weeks and after 5-6 weeks the first weeding was made. The second weeding followed one month after and the third was about 2 months after the second. By this time the canes were "five joints" above the surface of the ground and 20-30 canes had grown in each hole. After another 2 months, trash was stripped from the lower joints and a second stripping was performed 2 weeks later. In February or March the following year the canes were cut and the stumps left to ratoon for a further five years.³² Kernahans' method however, was the exception rather than the rule. He had the benefit of both capital and formal education and could therefore practice the more advanced methods.

In fact the majority of the cultivations used the older system. The field for cultivation was lined out in divisions

³¹Ibid., p. 254.

³²Ibid.

4' square or 5' or 6' by 4' and proposed holes for plants picketed with small stakes. Holes were then dug 16" or 18" square and 6" deep. Two plants were placed to a hole either flat or oblique. The depth to which the cuttings were laid, and the size of the cuttings depended on the season or soil type. The land was divided into unequal areas from 4 to 12 or 15 acres each and the spaces or tracks between each field from 10' to 16' in width; Planting was either in May-June or Sept.-Oct. depending on the whims or convenience of the planters.³³

Weeding operations followed Kernahan's suggestion providing the estates had the labour and capital. Weeding was done by the hoe and the introduction of the plough was still in the offing, despite the proprietors' knowledge of its advantages. Weeding, like pen manuring was expensive (Table 15). Wherever necessary, pen manuring was done after the second weeding and this increased yields up to 30%. An acre of cane cost \$31 to be manured manually. With a return of 1000 lbs. of sugar sold at \$4 per cwt., a net profit of \$9 was gained in the first year. Manure was collected from the open pastures when the livestock grazed. The soils of the Naparima district afforded longer periods of ratooning due to their more virgin and fertile nature.

January marked the commencement of the harvest season of full grown canes. Harvest lasted to the end of June, though

³³De Verteuil, p. 15.

TABLE 15

Weeding Costs - Trinidad 1850 - Ref. Kernahan, p. 261

Size of Task in rods of 10' square	No. of Sq. Ft. in a task	No. of tasks in a quaree	No. of tasks in an acre	Rate of wages per task	Cost per quaree	Cost per acre
					\$ cents	\$ cents
6 x 6	3,600	38	12 1/10	.30	.11	.70 3 .63
6 x 7	4,200	33 1/5	10 1/3	"	9	.96 3 .10
7 x 7	4,900	28 1/2	8 6/7	"	8	.55 2 .64
7 x 8	5,600	25	7 3/4	"	7	.50 2 .32
6 x 6	5,600	38	12 1/10	.40	.15	.20 4 .84
6 x 7	4,200	33 1/5	10 1/3	"	.13	.28 4 .30
7 x 7	4,900	28 1/2	8 6/7	"	.11	.40 3 .40
7 x 8	5,600	25	7 3/4	"	.10	.00 3 .10
8 x 8	6,400	21 3/4	6 4/5	"	8	.70 2 .72
8 x 9	7,200	19 1/3	6 2/3	"	7	.75 2 .66
8 x 8	6,400	21 3/4	6 4/5	.50	.11	.00 3 .30
8 x 9	7,200	19 1/2	6 2/3	"	9	.62 3 .20
8 x 10	8,000	17 1/2	5 1/2	"	8	.75 2 .75
9 x 9	8,100	17 1/4	4 9/10	"	8	.60 2 .45
9 x 10	9,000	15 1/2	4 7/9	"	7	.75 2 .35
10 x 10	10,000	14	4 1/10	"	7	.00 2 .05

Figures for 1871*

Quaree - 133,392 sq. ft.

Acre - 43,5600 sq. ft.

Canes planted at 4' require 2,722 holes per acre.

Canes planted at 4½' require 2,151 holes per acre.

Canes planted at 5' require 1,742 holes per acre.

Canes planted at 6' require 1,210 holes per acre.

*Ref. - The Trinidad Official and Commercial Register and Almanack
Hewey, F.J. Guppy - Edder - 1871, P.O.G. Chronicle Publishing
Office, page 93.

on some estates sugar manufacture for local use extended the operation to Sept.-Oct. Canes were usually cut at 15-18 months old. Plant canes matured 2 months earlier than ratoons which were cut first and mixed with the plant canes. It was not unusual for planters to cut canes aged 10-12 months or to leave crops for 24-28 months in an effort for a sure crop in the following seasons. Resulting inferior juices in the former instance, or mill breakages owing to hard canes, in the latter instance, were not uncommon. Canes were always cut by the task (Table 15) but the danger was that both ripe and green canes were cut en masse.³⁴

Population and Cane Land Holdings

Manufacturing operations were described earlier and inferior technology was forced to cope with inferior methods and inferior canes produced by the farmers. It was not until the big estates were formed that technology and cultivation methods improved.

By 1860 sugar was almost completely in British hands, and continued to be the main source of revenue for Trinidad. In 1895 Sewell found 280 sugar estates in the Island,³⁵ but this figure is questionable. Information gleaned from Hart and more precise information from the Trinidad Almanack of 1867 put the figure at 154 major sugar estates.³⁶ Sewell probably included the small cane farmers cultivating plots of

³⁴Ibid.

³⁵Sewell, op. cit., p. 117.

³⁶Guppy, H.F., (ed.), The Trinidad Official and Commercial Register and Almanack, 1867, Port-of-Spain: Chronicle Publishing Office, p. 46-49.

TABLE 16

ESTATES, LABOUR, PRODUCE - TRINIDAD 1867 (from Almanack p. 46 and Hart, p. 19, 20.)

WARD UNION	WARDS	NO. OF SUGAR ESTATES	INDENT	PRODUCE
Arima	Arima	7	216	71
	Guanapo			Cocoa, Coffee, Sugar (diminishing)
	Turure			Cocoa, Coffee
	Upper Caroni	2	134	Cocoa, Coffee, Rice, other ground Provisions
	Tacarigua	8	721	Sugar, Rum, Molasses
	St. Joseph	5	271	Sugar, Rum, Molasses, Cocoa, Ground Prov.
	Maracas			Sugar, Rum, Molasses, Cocoa, Coffee
	Lower Caroni	2	30	Cocoa, Coffee, Cedar and other Furn. Woods
	Caura	3	360	Sugar, Rum, Molasses, Cocoa, Coffee, Gr. Prov.
	Toco			Sugar, Rum, Molasses, Cocoa, Coffee, Charcoal
	Blanchisseuse			Cocoa, Coffee, Coconut Oil, Cassava, Stch.
	Aricagua	3	306	Cocoa, Coffee, Cassava, Starch Cedar Brds.
	Cimaroherd	1	124	Sugar, Rum, Molasses, Cocoa, Coffee
	Laventille			Sugar, Rum, Molasses, Cocoa, Coffee, Charcoal
	St. Ann			Ground Provisions, Charcoal, Cocoa. Coffee, Fr
	Sta. Cruz	3	27	Cocoa, Coffee, Fruit, Vegetable, Charcoal
	Diego Martin	3	165	Cocoa, Coffee, Ground Provisions
	Carenage			Sugar, Rum, Molasses, Cocoa, Coffee, Charcoal
	Mucorapo	2	118	Cocoa, Ground Provisions
	Maraval	2	73	Sugar, Rum, Molasses, Ground Provisions
	Carapichaima			Sugar, Rum, Mol. Cocoa, Coffee, Grd. Prov., Fr.
	Chaguanas	8	454	Sugar, Rum, Molasses, Cocoa, Cotton Chcoal
	Couva	9	1058	Sugar, Rum, Molasses, Cocoa, Cotton, Coffee
	Savonetta	5	584	Sugar, Rum, Molasses, Cocoa, Cotton
	Point-A-Pierre	6	321	Sugar, Rum, Molasses, Cocoa, Cotton
	S. Naparima East	42	2623	Sugar, Rum, Molasses, Cocoa, Cotton
	S. Naparima West			Sugar, Rum, Molasses, Cocoa
	S. Grande South	11	780	Sugar, Rum, Molasses
	S. Grande North			Sugar, Rum, Molasses
	N. Naparima East	13	661	Sugar, Rum, Molasses
	N. Naparima West			Sugar, Rum, Molasses
	Oropuche	6	218	Sugar, Rum, Molasses, Cocoa, Tobacco, Coffee
	Cedros	11	621	Sugar, Rum, Molasses, Coconuts
	La Brea-Guapo			Ground Provisions, Fruit, Pitch, Pineapples
	Moruga			
	Mavard			
	Nariua			
	Manzanilla			

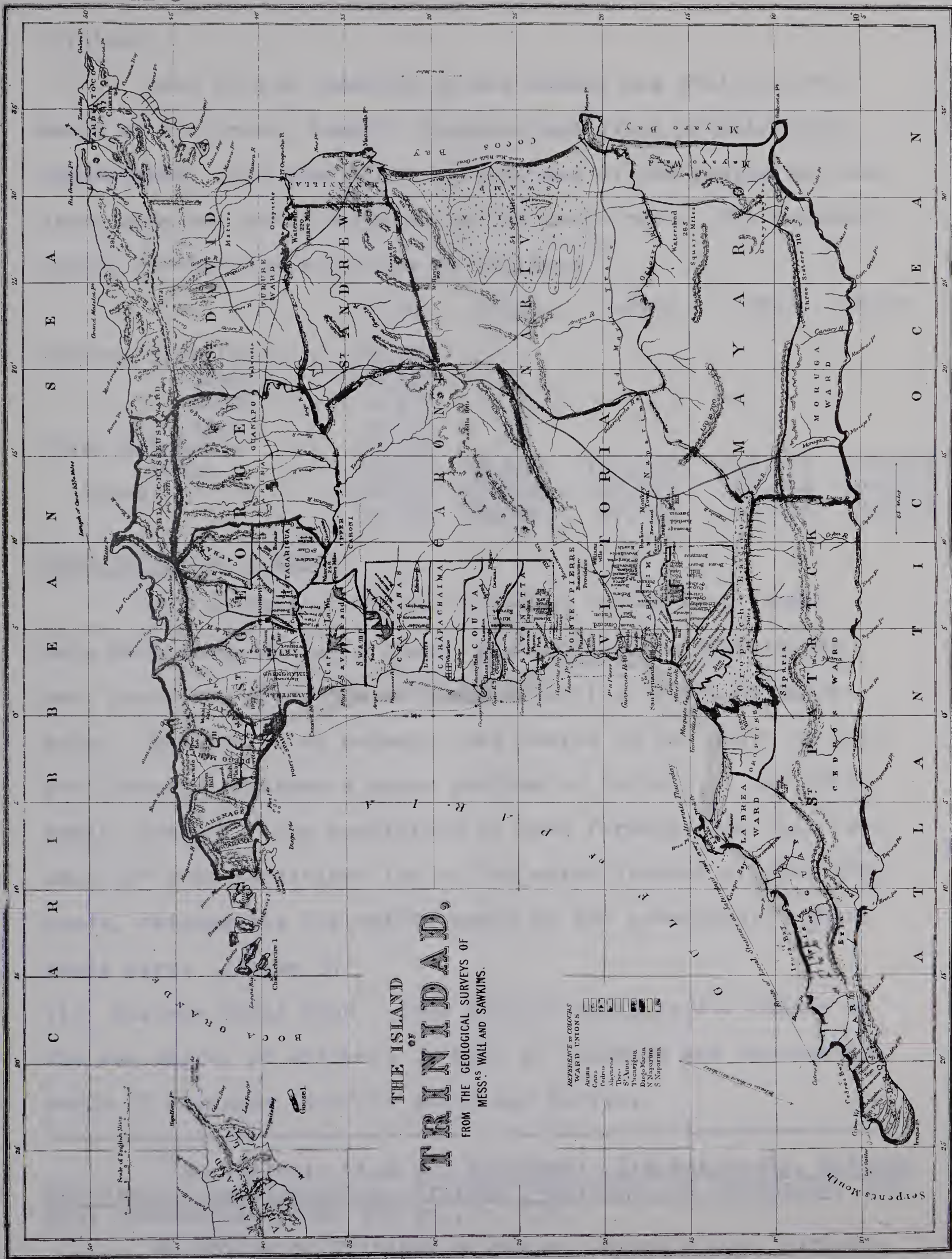
one to ten acres. In 1859 there were about 5-600 labourers of whom a large number were small farmers.³⁷ These small farmers were former African slaves and in many instances former indentured Indian labourers who preferred to remain in Trinidad and be granted £5 and 5 acres of land after completion of their indenture period.

The year 1865 is generally considered to be the start of the brief period of prosperity for the British West Indies. This prosperity lasted to 1884. In Trinidad, there was a very gradual movement towards estate amalgamation and many areas of cane cultivation ceased to grow cane. For example Guanapo, Erin. La Brea, Irois, Mayaro, Toco and Carenage, (Plate 3) which together produced 3,265,423 lbs. of sugar in 1836, produced absolutely none in 1864.³⁸

Of the 38 wards of the island (Plate 3) 13 were producing neither sugar nor its by products (Table 16). The 154 major estates cultivated 40,437 acres of a total acreage of 237,854 acres of private land (Table 16). Most of the estates were confined to the west coastal areas of the island especially in the Naparimas and Savanah Grande Districts of the fertile Southern Lowland Region. Of the 154 sugar estates in the Island, one hundred and eleven were situated in this region, accounting for roughly 80% of the sugar activity of

³⁷ Sewell, op. cit., p. 111.

³⁸ Hart, D., Trinidad and the Other West India Islands and Colonies, 2nd ed., Trinidad: 'Chronicle' Publishing Office, 1866, p. 82.



Trinidad.

Most of the interior of the Island was still in the hands of the Crown, heavily forested and still largely unconnoitered. The population in 1851 was 69,600 people but the birth rate was still exceeded by the death rate. The National origin of the population was as follows:³⁹

	1851	1861*	1871*	1881*	1891*
Natives of Trinidad -	40,584				
Africa -	8,150				
Europe -	1,508				
Asia -	4,200				
Other Emigrants -	15,158				
Total	69,600	84,438	109,638	153,128	200,028
Males	36,631	46,074	60,405	83,716	108,420
	32,969	38,364	49,233	69,412	91,607

Transportation - Roads

Transportation by road followed the areas of sugar cane settlement and as a result was confined chiefly to the west coast and along the southern foothills of the Northern Range. Road building material was scarce in the south so that road repairs remained a major problem to the end of the nineteenth century. The complaints of cane farmers about bad "wet seasons" road conditions led to the establishment of five Royal roads, responsible for maintainance by the government. These roads were: (Plate 3)

(1) Western Royal Road - from Port-of-Spain to Pt. Cumana on the sea shore, at entrance of Ward of Caranage and through the wards of Mucorapo, Cocorite and Diego Martin.

³⁹De Verteuil, L.A.A., Trinidad: Its Geography, Natural Resources, Administration, Present Condition and Prospects, London: Ward-Lock, 1858, 508 pp., p. 174.

*- Colony of Trinidad & Tobago, Census Album, Port-of-Spain; Government Press, 1948, p. 29.

- (2) Eastern Royal Road-Port-of-Spain, east to sea shore, and through the wards of Laventille, Cinaranero, Aricagua, St. Joseph, Tacarigua, Arima, Guanapo, Aripo, Turure and, the "high woods" to Manzanilla with branches to Mayaro and Toco.
- (3) San Fernando Royal Road - St. Joseph, south to San-Fernando, through wards of St. Joseph, Lower Caroni, Chaguanas, Carapichamia, Couva, Savonetta, Point-a-Pierre, North Naparima.
- (4) Naparima Royal Road - San-Fernando east to the mission of Savannah Grande with two branches one east to Mayaro the other south to Moruga.
- (5) Southern Royal Road - San Fernando to Cedros - "skirting the sea shore through the lagoon", Oropuche, La Brea, Guapo and Trois.

Water Transportation

Produce from the "east" was brought by overland roads to San-Fernando which served as a main shipment point for "southern" grown sugar. The Cipero river, south of San-Fernando flowing from the then district of Savannah Grande (Plate 3) was navigable for $1\frac{1}{2}$ miles above its mouth.⁴⁰ At this end, an embarkadere or shipping place was established to store the sugar for transshipment. Small canoes and rafts were used to transfer the sugar to ships waiting in the roadstead. Besides the Cipero river, two other shipping places were approachable at high tide. These were Ally's creek on the Bel Air estate (Plate 3) at the mouth of a "small ravine"; and Mosquito

⁴⁰Ibid., p. 77.

Creek at the northern entrance of the Oropuche Lagoon.⁴¹

Three major outlets drained the Oropuche Lagoon- Mosquito Creek or Blazinis River on the Naparima side; Godineau River on the Oropuche side and "by far the most important" and in the center another not designated. Godineau, who was an early French colonist, cut a mouth into the lagoon to form the Godineau River. His aim was to transport cane in punts from the interior. The river which afforded "considerable distance access into the interior"⁴² was a major transportation route for sugar till the early twentieth century.

Two steamers, the "Janet Tennant" and the "William Burnley" provided coastal communication on the western seaboard. The former made daily trips to San-Fernando via Chaguanas, Felicite Hall, Couva and Claxton Bay. On Saturdays and alternate Thursdays the run was extended to La Brea and Cedros with a daily average transport of 100 persons.⁴³ Some sugar was carried by these steamers from the Ports of Chaguanas, Couva and Cedros but their main task was in the delivery of imported foodstuffs and foods and in the transport of passengers.

The port of Port-of-Spain served as the shipment point for sugar grown in the northern lowlands. For southern sugar it was found to be more profitable to ship sugar directly out of the port of San Fernando rather than through Port-of-Spain, since the royal roads which connected these ports were

⁴¹Ibid., p. 316.

⁴²Ibid., p. 217.

⁴³Hast, op. cit., p. 47-118.

in constant need of repairs. Hart has estimated that to macadamise one mile of road 15' wide by 3' deep with a 4" layer of "metal" would cost \$6177.60.*⁴⁴ His estimate, which included cartage of material and so on, was made for a strip five miles outside of San Fernando, and amply reflects the poor conditions of roads at that time.

Rail-Railways were not important in the transportation of sugar and for some mysterious reason, by-passed the sugar belt. This is discussed in the following chapter.

Markets and Politics

The sugar industry of the British West Indies generally was not seriously affected by the American Civil War of 1861-65. Trinidad and Barbados, both centres of distribution for food-stuffs, shooks, staves and other packing products, appear to have been most seriously affected, and in 1862 the Governor of Trinidad remarked on the "checked state of expansion" in the colony because of the Civil War. At this period (1859-61), only 4,652 tons of sugar from the entire British West Indies went to North America, but by 1882, 78,604 tons went to this market.⁴⁵ (Table 14) The United Kingdom still had a scale of duties favouring muscovado sugar which was produced, and still remained the chief market in West Indies sugar.

Vacuum pan was introduced by 1865 and indentured labour

⁴⁴ Ibid., p. 51.

⁴⁵ Beachey, op. cit., p. 40.

*money in 1866.

helped immensely in easing labour difficulties. The trend towards estate amalgamation and the establishment of small centrals, helped in making profits. This is discussed in greater detail in the following chapter.

"Much of the prosperity of the British West Indies sugar industry as was manifested during the late 1860's and early 1870's is attributable to the scale of sugar duties maintained in the United Kingdom."⁴⁶ The Sugar Duties Act of 1846 and the Successive reduction of duties to 1854 was a gradual phase to the equalization of sugar duties in the United Kingdom.

The duty after 1854 was based on a graduated scale, successively increasing as the quality of the sugar ranged upwards. By 1864 the following duties were in effect:

refined sugar	12sh.	10d per cwt.	
equal to white clayed	11sh.	8d per cwt.	
not " " " "	10sh.	6d per cwt.	- includes vacuum
equal to brown muscovado	9sh.	4d per cwt.	pan.
not " " " "	8sh.	2d per cwt.	

Successive reductions were made until 1874 when sugar duties were completely removed in the United Kingdom. After this time the United Kingdom engaged in Free Trade principles and all classes of sugar entered the United Kingdom on equal terms. The immediate effect of the abolition of sugar duties was not a great drop in the price of muscovado sugar, but rather a drop in the price of higher classes of sugar and

⁴⁶...

Ibid., p. 44.

Table 17 — COMPARATIVE STATEMENT of the TOTAL VALUE of the PRINCIPAL ARTICLES exported, showing the INCREASE or DECREASE in the VALUE of each, during the FOUR QUINQUENNIAL PERIODS 1876-80, 1881-85, 1886-90, and 1891-96.

Article.	Total Value.				Difference between First and Second Period.		Difference between Second and Third Period.		Difference between Third and Fourth Period.		Net Increase or Decrease in Value of each Export.	
	1876-80.	1881-85.	1886-90.	1891-95.	Increase.	Decrease.	Increase.	Decrease.	Increase.	Decrease.	Increase.	Decrease.
Sugar	£ 4,003,107	£ 3,776,524	£ 3,576,498	£ 3,290,493	£ —	£ 226,583	£ —	£ 2,000,026	£ —	£ 286,005	£ —	£ 712,614
Molasses	237,236	297,548	257,802	234,463	60,322	—	—	39,746	—	23,339	—	2,763
Rum	11,393	12,322	17,647	22,938	929	—	5,325	—	5,291	—	11,545	—
Bitters	93,495	156,887	200,286	188,398	63,392	—	43,399	—	—	11,888	94,903	—
Total Sugar Products	4,345,221	4,243,281	4,052,233	3,736,292	124,643	226,583	48,724	239,772	5,291	321,232	106,448	715,377
Net increase or decrease in each period	—	—	—	—	—	101,940	—	191,048	—	315,941	—	608,929
Cocoa	1,534,864	1,722,802	2,429,842	2,733,386	187,938	—	707,040	—	323,544	—	1,218,522	—
Cocoa-nuts	76,123	157,623	175,913	174,604	81,500	—	18,290	—	—	1,309	98,481	—
Coffee	6,016	3,919	2,110	3,503	—	2,097	—	1,809	1,393	—	—	2,513
Sundries	2,559	53	9,341	10,635	—	2,516	9,288	—	1,314	—	8,986	—
Total Agricultural Products other than Sugar	1,619,572	1,884,397	2,617,206	2,942,148	269,436	4,613	734,618	1,809	326,251	1,309	1,325,089	2,513
Net increase or decrease in each period	—	—	—	—	264,825	—	732,809	—	324,942	—	1,322,576	—
Asphalt	114,600	198,458	338,274	335,940	83,858	—	139,816	—	197,666	—	421,340	—
Sundries	276,168	332,416	181,135	22,610	76,248	—	—	171,281	—	158,525	—	253,558
Total Non-Agricultural Products and Manufactures	390,768	530,874	519,409	358,550	160,106	—	139,816	171,281	197,666	158,525	421,340	253,558
Net increase or decrease in each period	—	—	—	—	160,196	—	—	31,465	39,141	—	167,782	—
Re-Exports	1,416,171	1,393,339	1,552,531	1,945,139	—	22,832	159,192	—	392,608	—	528,968	—
Total Exports of all kinds	7,771,732	8,071,891	8,741,379	9,182,129	300,159	—	669,488	—	440,750	—	1,410,397	—

hence greatly increased consumption of these. Most West Indies sugar was of the muscovado or lower type so that their volume of trade in this sugar was seriously checked. To add to this difficulty, the threat from bounty fed beet sugar took a serious form within a year or two of the removal of the sugar duties.

Bounty competition has already been discussed and its main effect was the lowering in the price of sugar without a corresponding lowering of cost of production in the West Indies. The Convention of 1879-1880 broke down because Britain and France would not agree to the principle of countervailing duties. The three years following this marked a decrease by $\frac{1}{4}$ of the sugar imports from the British West Indies into the United Kingdom (Table 17) but in Trinidad, vacuum pan sugar offered valiant competition with beet sugar on the world market. The crisis came in 1884 when Germany doubled her bounties on export and beet sugar began flowing into the United Kingdom. By the end of the year muscovado sugar fell to 13 sh. per cwt. from 20 sh., which was equivalent to, or less than, the cost of production on many Trinidad estates. Commercial depression set in on all the sugar colonies of the British West Indies, and generally the blame can be laid on the failure to breakaway from the old muscovado process.⁴⁷

Trinidad now became dependent almost solely on the United States market and for the five year period 1881-1885,

⁴⁷ Ibid.

51% of Trinidad's sugar exports went to the United States as compared with 46% to the United Kingdom. For the period 1886-1890, the proportion was 67% to the United States and 32% to the United Kingdom; and for the period 1891-1895, the proportion was 55% to the United States and 44% to the United Kingdom (Table 14).

But the United States market was unreliable, and they were making efforts to increase sugar production with the aim of becoming self-sufficient in this commodity. Trinidad's efforts to restore this situation after 1897, are discussed in the following chapter.

The Situation in 1897:

A Royal Commission appointed in 1896 to investigate the sugar industry situation in the West Indies stated that "there can be no general or early recovery from that depression unless either (1) prices rise or (2) the cost of producing sugar in the West Indies be reduced".⁴⁸ They found that to raise the price of West Indies sugar in an effort to restore prosperity, would cost the consumer in England at least £2 million per year - a suggestion which was immediately dismissed. Countervailing duties were also dismissed as well as a grant of bounty on sugar produced in the West Indies. In an effort to reduce costs the Commission recommend greater improvement in manufacture, improvement in cane varieties, establishment of central factories, and the encouragement

⁴⁸ West Indies Royal Commission Report, 1897, op. cit., p. 8.

COST OF PRODUCTION OF SUGAR ON THE "PALMISTE" ESTATE FOR FIVE YEARS
1892-96

	1892	1893	1894	1895	1896	Total	Average Cost
	2,012	2,409	2,230	2,635	2,726	12,012	per Ton of
Tons Sugar	Tons Sugar	Tons Sugar	Tons Sugar	Tons Sugar	Tons Sugar	Tons Sugar	Sugar
Cultivation	43,189	25	53,649	03	53,625	96	21 70
Purchase of farmers' canes	-	-	-	4,252	55	9,804	74
Manufacture-including, cutting, carting, and loading of canes, packages, fuel, chemicals oil, lime, etc.	24,553	70	28,104	00	29,594	26	11 30
Maintenance-including roads, railways, buildings, machinery, ponds, carts, and harness.	14,448	56	13,014	80	13,157	77	6 10
Immigration -	3,540	26	3,407	74	4,439	96	1 32
Immigration tax	2,102	02	2,153	93	2,224	30	0 89
Indenture fees	1,728	43	2,332	08	2,169	20	0 90
Hospital	12,400	34	13,018	70	14,386	73	5 06
Stock	13,173	15	13,891	53	14,435	85	5 75
Sundries - including superintendence, engineers' salaries, agencies, insurances, land and house taxes, etc.	115,116	71	130,472	80	134,034	03	54 28
Deduct value of offtal crop	4,031	30	2,941	67	1,499	12	1 22
Total	110,185	41	127,531	13	132,534	91	53 06
Nett cost per ton, exclusive of interest on current account.	54 76	52 53	59 43	50 27	40 30	53 06	53 00
Interest on current account	3,325	60	1,186	70	3,905	26	1 37
Cost per ton, including interest on current account.	56 41	53 43	61 18	51 89	50 80	54 43	54 43

COST OF PRODUCTION OF SUGAR ON THE FOREBS PARK ESTATE, SAVONNETTA, FOR FIVE YEARS 1892-96.

	1892	1893	1894	1895	1896	Total	Average Cost
	685	796	623	793	1,026	3,896	Per Ton
Tons Sugar	Tons Sugar	Tons Sugar	Tons Sugar	Tons Sugar	Tons Sugar	Tons Sugar	of Sugar
Cultivation	13,472	75	15,025	01	18,438	77	21 10
Purchase of farmers' canes	55	36	383	87	810	47	0 84
Manufacture-including cutting, carting, and loading of canes, packages, fuel, chemicals, oil, lime, etc.	13,326	14	13,652	85	11,681	96	15 05
Stock-purchase and keep of, and veterinary	6,020	03	6,348	59	8,010	45	8 03
Maintenance-including ponds, railways, buildings, machinery, roads, carts, and harness.	4,030	09	4,336	84	5,197	58	5 74
Immigration -	928	26	1,143	20	1,012	60	1 30
Immigration tax	907	82	969	50	1,008	00	1 11
Indenture fees	2,361	58	1,577	42	1,843	35	2 27
Hospital	7,834	88	10,477	66	7,671	78	10 78
Sundries-including superintendence, engineers' salaries, agencies, insurances, land and house taxes, etc.	48,936	91	53,567	73	55,249	36	66 22
Deduct value of offtal crop	7,373	76	6,560	25	5,169	33	7 82
Total	41,563	15	47,008	48	50,080	03	-
Nett cost per ton, exclusive of interest on current account.	63 10	59 05	80 38	56 17	80 38	56 17	58 40
Interest on current account	1,215	34	877	02	1,025	98	-
Cost per ton, including interest on current account.	65 01	60 15	82 02	57 68	82 02	57 68	-

COST OF PRODUCTION ON THE USINE STE. MADELEINE AND ESTATES FOR THE YEARS 1883, 1884, 1885, 1886, 1887, 1888, 1889, 1890, 1891, 1892, 1893, 1894, 1895, 1896

Per Ton Sugar	Field	Factory	Together	Improve-ments.	Nett Total	Per Ton Field
1883	56 12	41 61	97 73	31 56	97 73	1890
1884	50 76	37 77	88 53	43 55	88 53	1891
1885	32 44	30 97	65 18	35 65	65 18	1892
1886	34 41	26 36	58 80	34 05	58 80	1893
1887	27 55	24 46	51 71	44 62	51 71	1894
1888	32 85	26 48	59 33	31 40	59 33	1895
1889	33 23	32 21	65 44	31 17	65 44	1896

Factory Together	Improve-ments.	Nett Total
27 02	58 58	58 58
32 33	75 88	75 88
24 90	60 55	6 04
26 94	60 99	7 90
39 10	83 72	18 05
16 67	48 07	65 67
16 77	47 94	48 07

the sugar produced.

Subject: [illegible] Date: [illegible]

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of small cane farming.⁴⁹ They finally recommended substitution of other and "profitable agricultural industries for the cultivation of sugar cane".⁵⁰

Trinidad was thus dismissed by the mother country who finally realized her mistake of backing sugar in 1833. Recommendations made in 1838 for a diversification in agriculture and industry were dismissed because at that time, the United Kingdom needed sugar. The Crown Colony system and the backing of the planter class by the British Parliament saw to it that this goal of continued sugar cultivation was achieved. Now that Britain no longer was in need of Trinidad's sugar she was eager to recommend diversification, but the damage was already done. The evils of agricultural mono culture were a live reality among the native population. The United Kingdom was enjoying free trade and cheap bounty fed European beet sugar in its own interests.

The distribution of people and crops in 1897 was as follows:

No. of Coolie Immigrants	Area in Acres	Acres per unit of Population	Area under Cultivation	Area of cultiv- able land not bene- ficially occupied	Value of Exp. per head of population		
					£	s	d
83,000	1,193,313	4.88	310,000	550,000	5	16	11

Costs of production rose on all estates (Table 18) and estates were forced to close. Between 1887 and 1897, fifteen sugar estates were abandoned leaving 39 sugar estates.

⁴⁹ Ibid., p. 14.

⁵⁰ Ibid., p. 17.

Table 19

STATISTICS OF SUGAR CULTIVATION.

ESTATE.	I.	II.	III.	VI.	VII.	XVI.	XXII.	XXII.		XXII.	XXVIII.	XXIX.	
	Total Acreage.	Total Acreage In Cultivation.	Average Crop.	Amount of Capital Invested.	Total Amount spent in Improvements in last 10 Years.	Average Cost of Production per Ton per Annum.	Number of Indentured Immigrants Employed.	Number of Free Residents Employed.		Outside Labour employed during 1896.	Amount spent in Production of Sugar per Annum. (Average for 1894, 1895, 1896).	Amount of Imports per Annum. (Average for 1894, 1895, 1896).	
	Aeres.	Aeres.	Tons.	£	£	£ s. d.					£	£	
Camden - -	1,037	877	741	250,000	3,020	£	138	50	3,704	7,854	83		
Wellington - -	2,402	760	1,020		3,000	11 3 0	159	150	30	21,600	13,040	5	
Perseverance - -	1,400	830	785		5	5	71	81	0,870	0,389	371		
Waterloo - -	6,084	1,570	1,084		15,000	5	408	200	30,082	10,783	7,093		
Pictou - -	733	520	656		5	12 11 0½	107	123	30	7,013	8,000	5	
Exchange - -	1,050	1,050	1,040	45,000	7,130	5	100	102	17	877	11,560	1,253	
Bronté - -	3,071	1,400	1,200		10,000	5	323	537	03	800†	5	5	
Forres Park - -	2,307	1,000	1,000		28,085	12 3 4	183	130	42	170†	11,603	1,591	
Aranjuez - -	4,027	1,200	1,700		44,000	2,000	12 4 4	300	350	43	440	20,000	1,324
Orainish - -	615	400	500		10,000	3,000	11 10 0	02	30	50†	5,233	1,341	
Brechin Castle -	12,000	5,400	7,537	5	04,400*	12 17 7	1,114	1,002	173	2,400	81,036	33,408	
Caroni - -													
Lothians - -	12,025	6,495	7,200	5	03,768	5	1,102	1,583	1,168	80,800	13,337		
Estates of Sir Charles Tennant, Dinsley - -													
Woodford Lodge -	4,052	2,550	2,200	122,000	43,203	9 10 0	538	600	116,271	42,852	8,424‡		
Perseverance (Cedros). Palmiste - -	2,100	1,800	2,330	124,000	54,000	10 14 0	386	570	03	50	24,800	8,600	
Estates of the Colonial Co., Limited.	11,731	7,445	10,000	500,000	7,049	5	1,828	840	221	5	04,301	10,330	
Eudeavour - -	1,005	450	5	7,500	—	11 4 0	69	71	4	—	4,084	197	
* From 1894. † Daily average. ‡ Woodford Lodge alone. § No returns.													

* From 1894.

† Daily average.

‡ Woodford Lodge alone.

§ No returns.

Table 20.

STATISTICS OF CANE FARMING.

ESTATE.	No. of Tons Purchased.		From how many Farmers.	Quantity.		Is Industry extending?
	1895.	1896.		Largest.	Smallest.	
Crnignish -	1,795	2,733	150-200	Tons. 175	10 cwt.	Yes.
Brecon Castle -	232	1,907	94	90	8 "	Yes.
Caroni -	194	994	20	83	1 ton 10 cwt.	
Lothians -	1,742	2,872	394	104	4 cwt.	
Estates of Sir Chas. Tennant and Sons.	16,827		742	605	4 "	Yes, and will extend still further, unless the planter has to reduce prices. It is an industry that is being taken up by all classes, both coolie and creole.
Woodford Lodge -	*1,826	*6,178	73	1,097	3½ tons	Yes, unless the prices now paid for sugar are further reduced.
Aranjuez -	1,400	1,945	59	176	21 "	It is not. The contractors are all on land of estate, and are by no means satisfactory.
Usine St. Madeleine (central factory).	—	19,343	1,200	223	3 "	The industry is extending.
Palmiste Factory -	1,900	4,845	115	450	11 cwt.	Very much so. It would be a terrible thing for the cane farming peasantry if the sugar industry were abandoned.
Bronté -	—	1,017	53	103	1 ton 5 cwt.	The industry has extended to a very great extent during the last few years; and there is a prospect of a greater extension in the future, as lands within a reasonable distance of factories are eagerly sought after.
†Forres Park -	—	937	87	125	10 cwt.	Steadily increase as long as anything like prices at present paid can be relied on.
†Garden -	—	915	70	64	10 "	Slightly.
†Golden Grove -	—	3,540	126	179	50 "	Yes.
†Reform -	—	6,970	856	105	5 "	Yes.

* Besides 17,434 tons from two neighbouring estates.

† Taken from Return published by the Agricultural Society (Paper No. 46).

These estates were abandoned because 4 were more suitable for coconut cultivation, 4 were in the vicinity of Port-of-Spain and San-Fernando and thus sold as lots for housing, and the remainder because they produced only raw or muscovado sugar, and could not afford the erection of new works.⁵¹ Nearly every estate had steam mills and the total amount of capital invested in machinery and plant equipment required for manufacture amounted to £2,500,000, of which 3/4 was invested in machinery. From 1835 to 1837 an average crop of 59,974 tons was manufactured on 90 estates. Of these only 14, with an output of 28,500 tons, made vacuum pan sugar, the rest making common process or muscovado sugar. In 1897, of the 39 estates (Table 19), only 7 with an output of 2,000 tons were making muscovado sugar; six with an output of about 5,500 tons, made centrifugal muscovado sugar, while the remaining 26 made vacuum pan sugar.⁵² Generally, estates which were nearly all over 500 acres in size, were taking advantage of modern manufacturing processes and the export of vacuum sugar was dominant (Table 14).

Peasant Farmers

Small cane farming or peasant farming started in earnest in 1888, and peasant farmers supplied the central with cane at a fixed price of 9/- per ton. In 1895, 17,502 tons of

⁵¹Ibid., p. 100.

⁵²Ibid.

Table 21.- WAGES ON SUGAR ESTATES.

ESTATES.	Average Rate of Wages.			Have Wages been Reduced in last few Years?	To what Extent?	Why?
	Field Labourers.	Factory Hands.	Artisans.			
	Cts.	Cts.	Cts.			
Camden - - -	25	30	70	Yes - -	15 per cent. -	Owing to present depression.
Wellington - - -	25	30	60	Yes, for factory hands and artisans.	10 to 15 per cent.	
Perseverance - - -	25	32	80	Yes - -	10 per cent. -	Owing to low price of sugar.
Waterloo - - -	25	30	40-100	Yes - -	Factory hands 25 per cent. Cartermen 20 per cent.	
Picton - - -	25	30	60	Yes, for factory hands and artisans.	10 to 15 per cent.	To reduce expenditure.
Exchange - - -	25	30	80	Yes - -	15 per cent. -	
Forres Park - - -	25-30	30-50	40-120	Yes, for artisans.		Owing to low price of sugar.
Bronté - - -	25	20-35	40-60	Yes - -	20 per cent. -	Because former wages could not be paid.
Aranjuez - - -	—	30-60	70-100	No.		
Craignish - - -	25	30-35	70-80	Yes, for artisans.	Slightly.	To reduce expenditure, but old rates had to be reverted to.
Breechin Castle - - -						
Caroni - - -	25	35-40	65-70	Slightly -	—	To reduce expenditure, but old rates had to be reverted to.
Lothians - - -						
Estates of Sir Chas. Tennant.	25	30-40	60-120	Yes - -	60 per cent.	To reduce expenditure, but old rates had to be reverted to.
Dinsley - - -						
Woodford Lodge - - -	25-30	30-35	60-90	No.		To reduce expenditure, but old rates had to be reverted to.
Perseverance, Cedros - - -						
Estates of Colonial Company, Limited.	25	44	62	No.		To reduce expenditure, but old rates had to be reverted to.
Endeavour - - -	25	—	80	No.		
Palmiste - - -	25	30-42	60-80	Yes - -	5 to 10 per cent.	To reduce expenditure, but old rates had to be reverted to.

PERCENTAGE of ADULT MALE INDENTURED IMMIGRANTS who did not earn 6% a day for the Twelve Months ending 31st December 1894 and 1895:—

Estate.	Percentage.		
	1894.	1895.	
Aranjuez - - -	15	20	
Barataria - - -	42	39	
Ben Lomond - - -	15	32	
Bien Venico - - -	47	49	
Bonno Avonture - - -	24	24	
Bronto and Jordan Hill - - -	39	47	
Breechin Castle - - -	41	35	
Brothers - - -	50	48	
Buen Intento - - -	21	22	
Camden - - -	37	34	
Canaan - - -	23	6	
Caroni Usine - - -	22	30	
Cedar Grove - - -	27	27	
Cedar Hill - - -	57	52	
Columbia - - -	—	33	
Constance - - -	—	19	
Craignish - - -	22	25	
Dinsley - - -	20	22	
Endeavour - - -	29	30	
Esperanza and P. Park - - -	28	27	
Exchange - - -	20	27	
El Salvador - - -	21	Nil.	(Cocoa.)
El Reposo - - -	20	50	"
Florissante - - -	25	25	
Garden - - -	26	40	
Harmony Hall - - -	44	19	
Hermitago - - -	—	51	
Hindustan - - -	28	27	
Inverness - - -	40	35	
La Fortunée - - -	46	34	
La Ressource - - -	13	12	
Laurel Hill, &c. - - -	27	26	
L'Enviense - - -	—	37	
Lothians - - -	29	33	
Malgretento - - -	14	18	
Maraccas Bay - - -	25	12	(Cocoa.)
Milton - - -	40	36	
Mon Desir (Oro) - - -	44	35	
Mon Desir (S.C.) - - -	25	12	(Cocoa.)
Mon Plaisir - - -	34	48	
Mount Pleasant - - -	17	25	
Mararaval - - -	5	Nil.	(Cocoa.)
Orange Grove - - -	34	42	
Palmiste - - -	9	14	
Perseverance (Con.) - - -	34	36	
Perseverance (Ced.) - - -	22	27	
Petit Morne - - -	36	40	
Philippino - - -	37	40	
Picton - - -	31	25	
Plein Palais - - -	65	43	
Reform - - -	28	41	
Retrench - - -	28	12	
Rivulet - - -	31	28	
San Juan - - -	10	30	(Cocoa.)
San José - - -	12	7	"
San Pablo - - -	11	18	"
San Pedro - - -	10	Nil.	"
Sta. Luisa - - -	12	6	"
Spring - - -	—	29	
St. Augustin - - -	58	50	
St. Helena - - -	25	36	
Tarouba - - -	58	35	
Tortuga - - -	8	19	(Cocoa.)
Union Hal - - -	27	22	
Usine, Ste. Mad. - - -	—	43	
Waterloo - - -	49	54	
Wellington - - -	49	44	
Williams Ville - - -	35	53	
Woodford Lodge - - -	41	35	

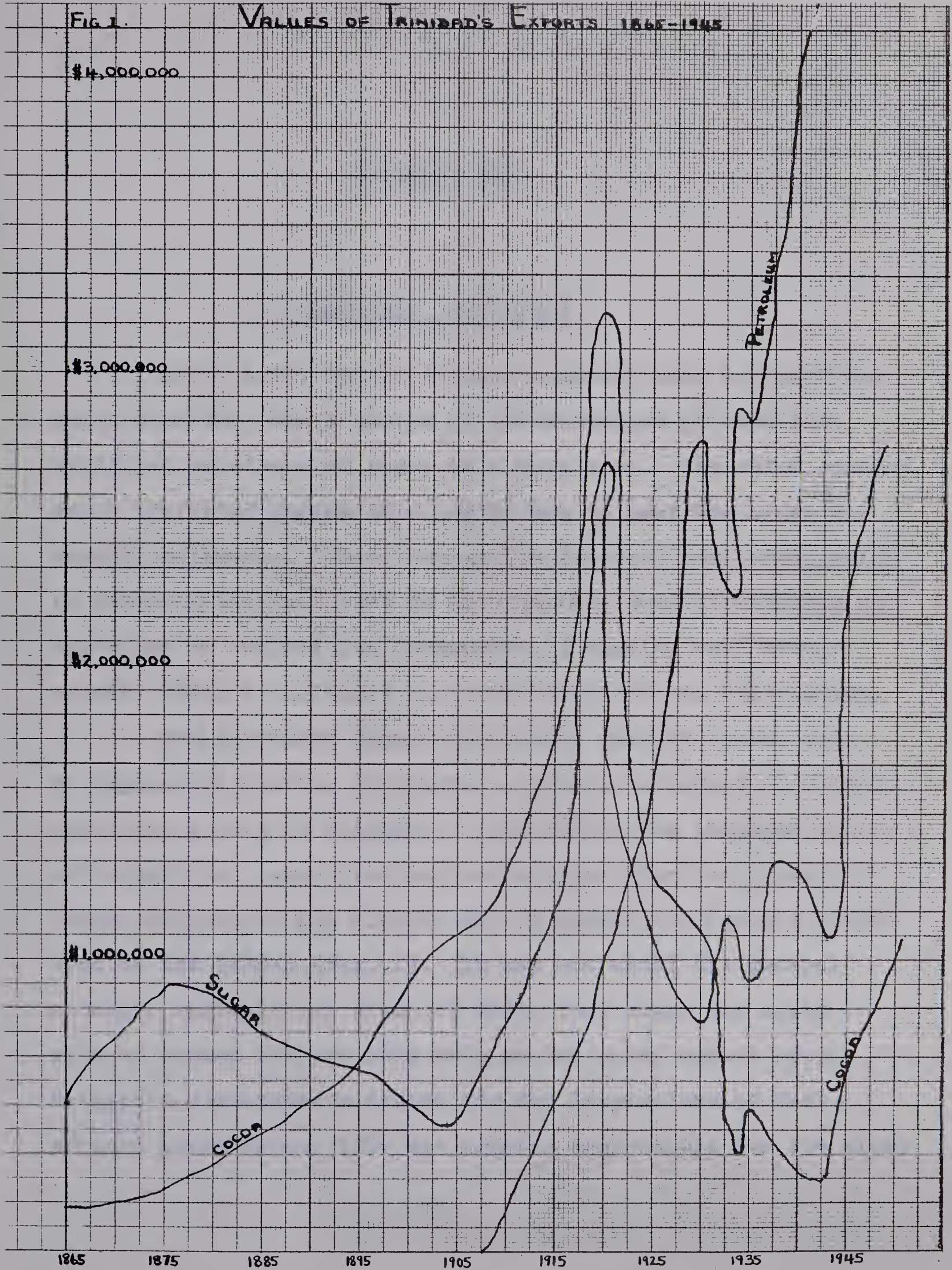
farmers canes were taken by the factories (Table 20) and in 1896, 62,629 tons⁵³ were accepted from 3,712 farms. Most of the farmers were ex-indentured labourers. Table 20 shows that this type of farming was extending and until today, small farmers play a very important role in supplying the factories with canes.

Due to the depression in 1897, wages on most estates were reduced. This is explained in the light of the developments which led to the depression. Reductions in wages averaged 10% (Table 21) and a large percentage of the working population earned less than 6d per day (Table 21).

The introduction of new varieties of cane and improved methods of cultivation and transportation came in the twentieth century, when now powerful centrals were better able to control their destinies. The great surge for improvement could no longer be delayed since beet sugar had taught the cane farmers many lessons in general improvement and economy. The "stage" was now being prepared for the final desperate effort towards improved sugar production. Informed management, large estates, and central factories, were the only realistic answers in twentieth century production planning.

FIG. 1.

VALUES OF TRINIDAD'S EXPORTS 1865-1945



CHAPTER FIVE

TRINIDAD: 1897-1938

After 1897, Trinidad sugar industry made a slight but shaky recovery, and a series of circumstances allowed the continued existence of sugar as a main crop. The chief concern which prevailed during this period was to keep the sugar industry profitable. That the results were not very encouraging is shown by the fact that in 1929 another Sugar Commission was appointed by the British Government to examine the 'severe crisis' being experienced in its colonies of the West Indies.

The increased demand for a good quality cocoa, made by English merchants, stimulated a greater interest in cocoa's continued growth in Trinidad. After 1895, the increase in the price paid for cocoa prompted cocoa proprietors to improve their cultivation and yields, and it became the leading export crop of the island (Fig. 1). It was not until the general economic agricultural slump of 1930, that sugar was again able to assume its pre-1895 role as the chief export crop. Britain's simultaneous demand for the large volume of West African cocoa around 1930 was greatly responsible for the slump

in the island's cocoa prices. Until today, Trinidad's cocoa has not fully recovered, partly due to the effects of continuing African competitions, and partly from the problems arising during the Second World War. The demand for the island's cocoa remains relatively small.

One of the major improvements made in the West Indies generally, and Trinidad in particular, was the introduction of new varieties of sugar cane into the island. By 1929, the Sugar Commission reported an area of 314,086 acres of land under cultivation, of which 32,874 acres were under sugar cane.¹ The total number of labourers directly employed in the sugar industry or occupied in canefarming was 40,000 people. This compares with 33,805 acres under cane in 1895, using a labour force of 12,503, plus an unknown number of part-time workers.² The decrease in acreage of cultivation was offset by an increase in cane yields per acre, owing to better methods of cultivation.

At the end of the nineteenth century, Bourbon was the plant grown commercially in Trinidad, and during the first 20 years of the twentieth century it was replaced by varieties bred in Barbados and British Guiana (now Guyana). The need for new varieties was felt with Bourbon's inability to with-

¹West Indies Royal Commission Report, 1897, op. cit., Appendix A., p. 100.

²Report on the Sugar Industry of the West Indies and British Guiana, Sugar Commission, 1929-30, London: H.M. Stationary Office, p. 105.

stand successfully the froghopper and blight attacks, which plagued cane cultivators during the first generation of the twentieth century. Beet sugar competition also necessitated the introduction of new varieties which would yield more sugar per acre, and be better suited to the different soils on which cane was grown.

The Breeding Stations

In the British West Indies, the first experimental work with cane varieties was started in Barbados in 1884. Canes were grown from seedlings from 1888 in Barbados with similar research carried out in Java, independent of the Barbados station. Canes from these two stations are designated B, Ba, and B.H. at the former station, and P.O.J. at the latter. For the period 1888-1925 seedlings were raised, and commercially successful ones selected from these two types. During the first 25 years, 10 excellent seedlings were produced of which the most important were B.H. 10/12 and Ba 11569.

Breeding work was carried on in Trinidad and Jamaica during this period, but no commercial varieties produced. It was also carried out in British Guiana from 1889-1945 and a number of successful varieties were produced, e.g. D625, Diamond 10D 14/34.* In 1932 a Central Cane Breeding station for

*Apart from Barbados and Java, the following designations are also used:

D - Demerara	P.R. - Puerto Rico	H - Hawaii
Co - Coimbatore, India	Q. - Queensland	

the British West Indies was established in Barbados, and research is still carried out on varietal types and yields.

The Properties of the New Varieties

The sugar cane plant is defined under the genus Saccharum and included wild and cultivated plants. There are five species, some of which are far from homogenous. These may be further divided into groups of varieties which differ in physical characteristics and sometimes in chromosomes number from other groups within the species.

(1) S. officinarum is comprised of cultivated varieties of the tropics with large juicy stalks rich in sugar and low in fibre. They were referred to by Dutch breeders as 'noble' canes. The seedlings from this variety tend to be male sterile and any cross with another species in hybridisation gives a female species. Hybrid types within this variety as well as with other species was common in an effort to find varieties suitable to differing soil and climate variations.

The Noble canes required a good base status throughout the soil profile; good natural drainage conditions and good moisture supply during the periods of drought. The true noble types which best adapted to Trinidad's conditions were the B 726 and B.H. 10/12, of which the latter is hybrid.

(2) Hardy canes, which comprise the other four species, are high in fibre and low in sucrose content. The chief hardy type grown in Trinidad was S. sinense, which is represented by several slender varieties which resemble one other in appearance. These are called 'Bamboo' canes in S. China and

'Chinese' or 'Uba' elsewhere, including Trinidad.

Hardy canes thrive in soil types with a poor base status, and in areas with fair to poor natural drainage and with a poor moisture supply during the dry season. The chief varieties which were grown in Trinidad were Uba, Co 213, and P.O.J. 2878. These varieties were ideally suited to resist the attacks of the sugar cane froghopper (Tomaspis saccharina) and rind fungus (Collectotrichum falcatum).

Introduction of Cane Varieties and Spread - to 1930

Up to about 1910, the Bourbon variety remained the chief cane grown in Trinidad.³ By 1919 however, 32 varieties of cane were harvested from about 12,000 acres.⁴ Only 3% of the harvested area was planted in hardy canes, chiefly Uba (see Table 22), whereas in 1936 the area planted in hardy types approached 50%. TABLE 22

PROPORTIONAL DISTRIBUTION OF SUGAR CANE VARIETIES REAPED IN
TRINIDAD IN 1919

Variety	B	D	B	B	Bourbon	Uba	B	D	B	Others
	156	109	347	640			1753	116	6303	
Area Reaped %	43.1	27.6	7.2	5.0	4.5	2.6	2.0	1.2	1.0	5.8

Noble canes, chiefly the New B.H. 10/12 predominated (Table 23) and replaced the 1919 canes during the decade

³Chenery, E.M., The Soils of Central Trinidad, Trinidad: Government Printing Office, 1952, 43 pages, p. 34.

⁴Charter, C.F. and Turner, P.E., A Preliminary Survey of Soil Types of Sugar Estates of Trinidad with special reference to the Allocation of Sugar Cane Varieties, p. 1.

following the "Great War".⁵ TABLE 23

PROPORTIONAL DISTRIBUTION OF S-CANE VARIETIES REAPED ON TRINIDAD ESTATES (1935-38) BASED ON RETURNS FROM 3/4 of AREA

Harvest Year	Area Under Noble Canes			Area Under Hardy & Other Canes			
	B.H.	10/12 %	B. 726 Total	Uba	Co213	P.O.J. 2878 %	Total
1935	53.4		0.4 53.8	38.3	5.0	2.9	46.2
1936	52.4		1.3 53.7	31.0	13.6	1.7	46.3
1937	55.4		2.4 57.8	26.3	14.6	1.3	42.2
1938	51.9		7.8 59.7	26.3	12.3	1.2	40.3

There were five main reasons for the increased area in the planting of hardy canes:⁶

- (1) The depression in the sugar industry after the Great War led to planting of long ratooning varieties in place of short ratooning varieties for reasons of economy.
- (2) The introduction of mechanical methods of preparatory cultivation, and the very greatly increased and more scientific use of inorganic manure, together enabled hardy canes to be profitably grown on extensive areas of relatively infertile soils, which previously could not support profitable crops of cane.
- (3) Hardy canes, by virtue of their greater vegetative vigour, were much less expensive than noble canes to keep free of weeds. Hardy canes were therefore planted in the wetter areas liable to become infested with weeds but which otherwise could satisfactorily be planted in noble canes.

⁵Ibid.

⁶Ibid., p. 2.

- (4) A depression in the cocoa and coconut industries around the 1930's led to partial replacement of these crops by sugar cane. The converted areas as a rule were planted for a time in hardy canes as the cocoa and coconut stumps precluded efficient preparatory cultivation.
- (5) Sugar cane was then subject to froghopper attacks in Trinidad. Noble canes suffered more greatly from these attacks than hardy canes. As a result there was a tendency to plant hardy canes in areas subject to severe damage from froghoppers. Normally, noble canes had been grown in such areas.

Soil Knowledge and Cane Adaptation

With the failure of the British West Indies sugar market in 1897, proprietors realised that one of their main aims was to understand the soils on which they grew cane, in an effort to improve varieties and yields. Research done in Barbados and British Guiana on cane varieties served as the only measure to the Trinidad planter in understanding how these varieties adapted to different soil conditions. With the establishment of the Imperial College of Tropical Agriculture (or I.C.T.A.) in Trinidad in 1923, research was immediately started in classifying Trinidad's soils agriculturally. It was not until 1938 that the soils of the sugar cane areas were completely classified, by C.F. Charter, and his classification is used in this study.

Charter classified the sugar cane soils of Trinidad

THE DISTRIBUTION OF CANE VARIETIES ON SUGAR ESTATES IN TRINIDAD - 1930*

SOIL FASCS AND SOIL SUITES	SOIL SERIES	AREAS AND ESTATES RECOGNIZED	VARIETIES GROWN
WATERLOO FASC: Containing Soils with seasonally impeded drainage and a seasonally high-water table developed under a tropical climate in which the humid element predominates, but which also comprises a well defined dry season. FREDERICK SUITE: Containing dark-grey soils with relatively abundant organic matter developed over exceedingly heavy plastic swamp clays.	Frederick	Caroni Estate	Hardy canes such as Co213 and Uba. Little B.H. 1012 success. Froghoppers frequent recovery of noble canes poor.
	Bejucal	Orange Grove (Oropuna Section) Caroni Estate (Mac Plaisir, Washington, Wilderness and Bejucal Sections) Northern part of Woodford Lodge Estate.	B.H. 10/12. Average to very good crops.
	Oropuna	Extreme S.E. of Orange Grove Estate (Oropuna Section)	B.H. 10/12. Successful
WASHINGTON SUITE: Containing brown or brownish-grey coloured soils developed over recent river alluvium of relatively coarse texture. Areas Found: Orange Grove (O. Grove & Macoja Secs) Caronia (Curepe, McLeod Plain, Frederick, Washington, Wilderness and Mon	Washington	South of Caroni River and North of Barrancoues River.	B.H. 10/12 on heavier soils Co 213 and Uba (Waterloo and Felicite) P.O.J. 213, B 39, Co 213 and Uba on Woodford Lodge. Little Froghopper blight.
	Guaramare	Frederick Section of Caroni Estate	Co 213 and Uba. Also B.H. 10/12 - giving poor returns.
	Couva	Alluvial fan of Couva River and South of Camden, Exchange and Perseverance and on Brechine Castle.	B.H. 10/12 - Excellent Co 213 - on sandy loam.
Plaisir Sections) Woodford Lodge (Woodford Lodge, North and South Perseverance, and Jerningham Junction Sections) Waterloo (Felicite, Waterloo, Camden, Exchange, Perseverance and Brechin Castle Sections) and Usine St. Madeline (Harmony Hall Section)	Orange Grove	Orange Grove Estate proper (middle section) Caroni Estate (Curepe Section) Old Valsayn Estate Site. Lower fringes of alluvial fan of Taconguia River.	B.H. 10/12. Also Co 213 and Co 290. Froghopper attacks frequent.
	Tacarigua	Small area north of Orange Grove Estate. Merges on south into Orange Grove Series.	B H 10/12. Excellent; both plants and ratoons. Froghoppers not too severe.
	Waterloo	Heavy clays along coast of Union and Waterloo Sections, south of Waterloo factory; light texture soils further inland.	B 726, Co 213, Uba, P.O.J. 2878. B.H. 10/12 - does poorly.
WATERLOO SUITE: Containing brown or brownish grey soils developed over parent materials devised from red or brown mottled clays, sandy clays or gravelly clays. Areas Found: Orange Grove (southern part of O-Grove proper, Oropuna Section, and greater part of Dinsley Section) They are scattered over Caroni and Woodford Lodge Estates and greater part of Waterloo Estates proper, excluding Felicite Estate.	Cunupia	Orange Grove (south of Orange Grove proper and Oropuna Section). Caroni (Washington and Mon Plaisir Sections) Woodford Lodge, on east southern part of Felicite and to a much smaller extent Waterloo Estates proper. Most fertile series of Waterloo Suite.	Co 213, P.O.J. 213, P.O.J. 2878, B.H. 10/12 - chiefly grown and average to very good crops. Little known of froghopper blight.
	Streatham	North of Streatham Lodge, Dinsley and Cane-farm.	B.H. 10/12
	Arouca	Orange Grove Estates (Dinsley Section). S. E. Orange Grove (itself) and south of Cane-farm Section.	B.H. 10/12 - deeper alluvial areas. P.C. 916 - on well cultivated & manured fields. Co 213 - ditto (ratoon well) P.O.J. 2878 - Also treed. P.O.J. 213 & P.O.J. 36
DEVENISH SUITE: Containing light greyish brown coloured soils developed over parent material derived from previously leached terrace sands overlying mottled clays similar to these in Newland the last suite. Areas Found: Orange Grove (Dinsley, Oropuna, Cane-farm Sections) Woodford Lodge (N.E. Jerningham Junction Section) and Waterloo Estates (Exchange Camden and McBean Sections)	Devenish	East of McBean and Exchange Sections and North of Camden Section of Waterloo Estates.	Co 213 - chief variety. Resists froghopper. Uba - in part times Co 290, B.H. 10/12 and B 726 - recently tried. Latter 2 do poorly in dry season. Little froghopper attacks owing to sandy soils and Co 213.
		Same as Devenish Series	
	Dinsley	North Streatham Lodge, Orange Grove and Dinsley Estates. Only small section of Orange Grove estate actually cultivated in sugar.	Co 213 and B.H. 10/12 on Orange Grove. B.H. 10/12 - by peasants but not very successful.
STE. MADELEINE SUITE: Containing soils variously coloured from red to blackish brown, of very heavy texture and developed over parent materials derived from marine clay shales. They frequently contain considerable accumulations of soluble salts in the horizons below the soils proper. Areas Found: Naparima Region. Central Range and south.	Piarco	Orange Grove Estate on extreme east and south of Oropuna and Cane-farm Sections.	Co 213 B.H. 10/12 - unsuccessful
	Ste. Madeleine	Hilltops and Hill-sides of Southern Basin	Uba - almost exclusively B.H. 10/12 - affected by dry season.
	De Be	Occurring in valleys between hills covered with red soil of the Ste. Madeleine series.	B.H. 10/12 and B 726 and Uba.
HERMITAGE SUITE: Containing black or blackish, very heavy clay soils developed over parent materials derived from calcareous marls, and free from accumulations of soluble salts. Areas Found: Hermitage, Princess Town and Naparima District. Some of most fertile Trinidad soils. Ratoons 12 - 15 times.	Tarouba	Hills and hill-sides of Southern Basin Region.	B.H. 10/12 and B 726. Some Uba.
	Pilton	May be combined with Palmiste series - Hermitage Suite.	Noble cane varieties.
	Hermitage	Hermitage Estate and in Naparima District.	Excellent noble canes such as B.H. 10/12 and B 726. Uba occasionally grown.
ESPERANZA FASC: Containing soils with free drainage, developed under a tropical climate in which the humid element predominates but which also comprises a well defined dry season. ESPERANZA SUITE: Containing red or reddish brown loams or sandy loams with little obvious profile structure. Areas Found: Considerable area under cultivation lower slopes of Naparima Range (Paradise Series) and also on Brechin Castle and Esperanza Estates (Esperanza Series) Small areas under same in Naparima district (Woodland Series,	Palmiste	Valleys	B.H. 10/12 and B 726 - excellent.
	Esperanza	Extreme south of Northern Basin on the foothills of the Central Range.	Uba or Co 213. Noble canes do poorly owing to drought and root diseases.
	Woodland	Forest sands of Naparima Formation	Uba
Paradise	Paradise	Foot of Northern Range. Cultivated by peasants only.	B.H. 10/12.

*Ref. Table compiled from
 C.F. Charter, P.E. Turner - A Preliminary Survey of Soil Types of Sugar Estates of Trinidad with Special Reference to the Allocation of Sugar Cane Varieties.

Secs) Caronia
(Curepe, McLeod
Plain, Frederick,
under cultivation
lower slopes of
Northern Range
(Paradise Series)
and also on Brechin
Castle and Esperanza
Estates (Esperanza
Series) Small areas
under same in Nap-
arina district
(Woodland Series,

South of Camden, Exchange and
Perseverence and on Brechine
Castle. Co 213 - on sandy loam.

*Ref. Table compiled from
C.F. Charter, P.E. Turner - A Preliminary
Survey of Soil Types of Sugar
Estates of Trinidad with
Special Reference to the Allo-
cation of Sugar Cane Varieties.
87 pages.
Compiled from pages
12 - 55.

into fascs, suites, series, types, and phases. (see table 24)⁷
A soil series contained all those soils developed under similar conditions from identical parent material, and therefore exhibited precisely similar profile characteristics. A soil series was given a locality name, for example, Washington series.

Soil series were divided into types on the basis of the texture throughout the profile and had a two-fold name, the name of the series in which they were included, and textural name; for example, Washington Silty Loam. Soil types were subdivided into phases on the basis of minor variations in chemical composition, physical structure and so on.

A soil suite was a group of soil series derived from similar, but not identical parent materials, under similar conditions of development. Washington suite; for example, contained all those soils series developed over recent relatively coarse river alluvium under similar conditions of seasonal drainage impedence. Suites were named after one of the more important series that they contained.

A soil fasc was a group of soil suites developed under similar soil forming conditions such as climate and drainage, irrespective of the nature of the parent materials from which they were derived; for example, Waterloo fasc. Fascs were named after one of the more important suites that they comprised.

⁷Ibid., pp. 14-16.

TABLE 25

A classification of soil types of the sugar-cane areas of Trinidad and their probable varietal requirements*

Soil Type	Base status throughout profile.		Natural Drainage	Moisture supply during dry season.
	Lime			
	Potash			
Frederick Very Heavy Clay	Fair to good	Good	Poor	Fair to Good
Neutral Phase				
Couva Silty Loam	Fair	Fair	Good	Good
Tacarigua Silty Loam	Fair to low	Low	Good	Good
Tarouba Heavy Clay	Good	Good	Fair to good	Good
Picton Heavy Clay	Good	Good	Fair to poor	Good
Hermitage Heavy Clay	Good	Fair to low	Good	Fair to good
Palmiste Heavy Clay	Good	Fair to low	Fair to poor	Good
Bejucal Heavy Clay	Fair to poor	Poor	Slow	Good to fair
Washington Silty Loam	Fair to poor	Poor	Slow to poor	Good to fair
Orange Grove Silty Loam	Fair to poor	Poor	Slow to poor	Good to fair
Deep Phase				
Cunupia Clay	Fair to poor	Poor	Slow	Good to fair
Debe Heavy Clay	Fair to poor	Good to fair	Slow to poor	Good to fair
Couva Sandy Laom	Fair	Poor	Seasonally poor	Poor
Washington Sandy Loam	Fair	Poor	do.	Poor
Orange Grove Silty Loam, Shallow Phase	Fair	Poor	do.	Poor
Paradise Series	Fair to poor	Poor	do.	Poor
Frederick Very Heavy Clay	Poor	Good	Poor	Fair to poor
Acidic Phase				
Waterloo Heavy Clay	Poor	Fair to good	Poor	Fair to poor
Ste. Madeleine Heavy Clay	Poor	Good	Poor	Poor
Waterloo Clay and Clay Loam	Poor	Poor	Poor to fair	Poor to fair
Arouca Clay, Normal and Alluvial Phases	Poor to fair	Poor	Poor to fair	Poor to fair
Streatham Clay, Normal and Alluvial Phases	Poor to fair	Poor	Poor to fair	Poor to fair
Waterloo Silty Loam	Poor	Poor	Fair to poor	Poor
Denenish Series	Poor	Poor	Fair to poor	Very poor
Newland Series	Poor	Poor	Fair to poor	Very poor
Dinsley Series	Poor	Poor	Fair to poor	Very poor
Piarco Series	Poor	Poor	Fair to poor	Very poor
Esperanza Series	Poor	Poor	Excessive	Very poor
Woodland Series	Poor	Poor	Excessive	Very poor

Turner and Charter had further classified the sugar cane soils, emphasising the inter-relationships of soil type, base status natural drainage, and the moisture supply during the dry season. This classification was meant to show ideal inter-relationships, and do not show the actual relationships of variety and soil which existed. (Table 25)

The agricultural factors which they used in determining the grouping of the soil types were:⁸

- (1) Base status throughout the soil profile, with special reference to lime and potash.
- (2) Natural Drainage.
- (3) Moisture supply during the periods of low rainfall.

Three main agricultural groups were recognised for the purpose of the allocation of varieties. These were:⁹

Group One - Soils suited to noble canes

- (a) of the type of the variety B.H. 10/12
- (b) of more robust type than B.H. 10/12
- (c) drought resistant noble canes (or alternatively hybrids of noble and hardy canes with noble characteristics predominating)

Group Two - Soils suited to hybrids of noble and hardy canes

- (a) with noble characters predominating
- (b) with hardy canes predominating

Group Three - Soils suited to hardy canes.

Generally B.H. 10/12 was grown on the more fertile

⁸Ibid., p. 72.

⁹Ibid.

TABLE 26
FACTORS DETERMINING THE CLASSIFICATION OF SOILS INTO AGRIC. GROUPS
IN RELATION TO VARIETAL REQUIREMENT

Probable Varietal Requirement	Agricultural Groups	Base Status of Soil Throughout Profile	Natural Drainage	Moisture Supply During Drought
NOBLE CANES				
GROUP I				
B.H. 10/12 type	1 (a)	Fair to Good	Fair to Good	Good
More Robust than B.H. 10/12	1 (b)	Fair to Poor	Slow	Good to fair
Drought Resistant	1 (c)	Fair to Poor	Seasonally Poor	Poor
NOBLE BY HARDY HYBRIDS				
GROUP II				
Noble Predominating	2 (a)	Poor to fair*	Poor to Fair	Fair to Poor
Hardy Predominating	2 (b)	Poor	Poor to Fair	Poor to Fair
HARDY CANES		Poor	Fair to Poor or Excessive	Very Poor
* - Poor in lime, good in Potash.				

soils, and Uba on poorer soils. In actual cultivation, many years were spent in trial and error plantings, and by 1930, most estates had conformed to the idealised cane varieties in the soils recommended by Charter and Turner. An examination of Table 24 reveals that some areas of peasant cultivation were cultivated with unsuitable varietal types but after 1930, these mistakes were gradually rectified by both example and advice.

Noble canes produced in commercial quantities require a comparatively good base status, with a particularly good lime status not only in the cultivated topsoil but throughout the profile (Table 26). The separation of noble cane soils into sub-groups as shown on the previous page), was dependent on their capacity for natural drainage and their ability to supply moisture to the crop during drought. For example, noble canes of the B.H. 10/12 variety were planted in areas where natural drainage was fairly good on the average and the moisture supply during drought was good. B.H. 10/12 was a variety exacting in its needs, and was not as hardy as the other widespread variety, Uba.

Noble canes of a more robust variety than B.H. 10/12 grew in areas of slower natural drainage while drought resistant noble varieties grew in poor drainage areas. (Group I)

Noble by hardy hybrids grew generally in soils which were inferior in base status to noble cane soils. Neither natural drainage nor moisture supply during drought was good on these noble-by-hardy soils, and the severity of drought and soil

conditions determined the predominance of a varietal type. Noble predominating cane soils (Group 2 (a)) for example, had a good potash status whereas hardy predominating cane soils (Group 2 (b)) had a poor potash status.

Hardy cane varieties grew in soils with a poor base status and low moisture supply capacity during drought (Group 3, Table 25). Natural drainage was either fair to poor or excessive, and the circumstances were such that satisfactory returns were likely to be obtained only when canes definitely hardy in type were planted.¹⁰

Actual distributions in 1930 show that about 40% of the area under estate cultivation was planted in noble canes (Table 25). These covered the suites of Frederick, Washington, Waterloo, Ste. Madeleine, Hermitage and Esperanza in the Central and Southern Plains. Some exceptions appear in the Couva sandy loam, Washington sandy loam, Orange Grove silty loam and Paradise series areas which were chiefly in the Northern Plains. Because of the sandy and silty loams, they are subject to drought or excessive flooding depending on the season, and had a poor potash status. As a result a variety of both noble and hardy types was grown, for example, Uba, CO 213, P.O.J. 213, P.O.J. 2878, B. 39, B.726, and B.H. 10/12 (Table 23).

About 40% of the estate area under cultivation was planted in hybrids of noble and hardy canes and included the suites of Frederick, Waterloo and Ste. Madeleine. In these

¹⁰ Ibid., p. 74.

areas clays predominated and range from clay loams in the Waterloo sub-groups to very heavy clays in the Frederick suite (Table 25).

Soils suited to hardy canes comprised about 20% of the area under estate cultivation and included the suites of Waterloo, Devenish and Esperanza. The specific series were Waterloo, Devenish, Newland, Dinsley, Piarco, Esperanza and Woodland, which were all characterised by a meagre supply of nutrients throughout the profile, and a very poor capacity for supplying moisture during drought (Table 25). The orderly preference for varieties, found in the 1930's was due to a number of observations made in the past two decades of the twentieth century. There was a noticeable relationship between the environmental factors including soils and the occurrences of insect and insect pest infestation leading to reduction in yields. Two of the diseases to affect yields adversely in this period in Trinidad are the Froghopper and blight.

Weather, Soil Type and Varieties in Relation to Froghopper Attack and Damage

The sugar cane froghopper (Tomaspis saccharina) was first positively indentified in Trinidad in 1889. The froghopper is a sucking insect about the size of a housefly, and was found chiefly in Trinidad, Grenada, and St. Vincent. The female laid about 50-100 eggs in the soil around each cane stool. The eggs hatched after 14 days giving rise to wingless nymphs which lived for 4-6 weeks in a mass of froth or spittle,

RAINFALL, BLIGHT DAMAGE AND CROP IN TONS 1906-1919*

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YEAR DRY SEASON BEGINS	DRY SEASON	WET SEA- SON BE- GINS	FLOODS	DROUGHT AND IN- DIAN SUMMER	WET SEASON ENDS	RAIN- FALL IN INCHES	BLIGHT	CROP IN TONS	CROP YEAR
1906 19-20 Dec.	Long and Severe	8-13 May	May wet, many days through- out year with 2" rain	1st half of Sept. and End of Oct.	13-15 was Dec. dry.	69.29"	Bad	50,564	1906-07
1907 12-16 Jan.	Short, not severe	Gradual 10 May to June 9th.	A few in June and July	Oct 7 - and Nov. dry.	20-27 was Dec.	62.56"	Bad	49,933	1907-08
1908 20-28 Dec.	Somewhat severe in north	Gradual End of April - 21 May	Severe floods in July. Dec. wet.	Sept. in (especi- ally end) and Nov. dry.	1-15 Feb.	60.56"	Bad	52,972	1908-09
1909 1-18 Feb.	Very short	Gradual 19 Apr. - beginning of June	Occas- ional floods in June, July, and Sept.	Very slight in mid- Jan.	31 Dec. to 12 Jan.	79.07"	Slight	51,950	1909-10
1910 1-12 Jan.	Feb. very wet. Mar. wet.	19-24 May	Occas- ional. Through- out the year.	3-20 Sept was slight End of Nov slight. Dec. was dry.	8-28 Dec. to Dec 22	70.60"	Slight	46,718	1910-11
1911 9-29 Dec.	Very long and fairly severe	28 May - fairly 2 June	June very wet. Oc- casional floods later.	Very Second half Sept. to first half Oct., fairly severe. End Oct. slight	End Nov. to Dec 22	58.76"	Bad	40,936	1911-12
1912 End Nov. (See to table 23 Dec.	Very long and very severe	17-20 May	Slight in June	End Aug to mid Sept. slight. Oct dry through- out.	14-24 Jan.	58.86"	Very Bad	42,488	1912-13
1913 19-26 Jan	Severe, long and late	Gradual	Occa- sional. End of Aug and Sept.	July and Aug dry. Slight in early Oct and early Nov.	10-24 Dec.	57.52"	Slight	55,488	1913-14
1914 11-25 Dec.	Long and severe	Gradual 17-26 May	Slight in June	July dry Aug un- usually dry. Mid- Oct stly dry	6-9 Jan	51.13"	Slight	58,822	1914-15
1915 6-10 Jan.	Short but severe. Mar. very dry.	25 Apr	Occas- ional. June and Oct	End of May Aug July mid not severe Dec. dry in North	22-26 to Jan.	60.29"	Slight	64,231	1915-16
1916 23-30 Jan.	Long, late and very severe	Gradual May to severe mid- June	Aug 19- 24 and Nov. 9- 12	No dis- tinct Indian Summer	10-22 Dec.	63.68"	Very Slight	70,891	1916-17
1917 11-23 Dec.	Long and Severe	19-22 May Sudden	July wet Slt floods in Aug and Dec	Oct dry especi- ally be- ginning and end. Most se- vere in Cova dis- trict.	23 Jan to 4 Feb	63.41"	Very Bad	45,256	1917-18
1918 24 Jan 5 Feb	Not long, Mar dry. Less severe in south	25-27 May Sudden	Occas.	1st half Sept and Oct Both fairly severe	26 Dec to Jan 2	60.00"	Bad	47,850	1918-19
1919 Dec 27 3 Jan	Severe to mid-Mar.	29 Apr to 12 May	Mid June Aug 31 and Dec	End Sept mid Oct, and Dec 15 not very severe. Wet again.	19 Dec End of very Jan.	65.24"	Not Bad	58,416	1919-20

later. Oct., fairly severe. End Oct. slight

1912 End Nov. (See to table 43 Dec.	Very long 17-20 May and very severe	Slight in June	End Aug to mid Sept. slight. Oct dry through- out.	14-24 Jan.	58.86" Very Bad	42,488	1912-13
1913 19-26 Jan	Severe, long and late	Occa- sional. End of Aug and Sept.	July and Aug dry. Slight in early Oct and early Nov.	10-24 Dec.	57.52" slight	55,488	1913-14
1914 11-25 Dec.	Long and severe	Gradual 17-26 May	Slight in July dry Aug un- usually dry. Mid- Oct stly dry	6-9 Jan	51.13" slight	58,822	1914-15
1915 6-10 Jan.	Short but 25 Apr severe. Mar. very dry.	Occas- ional. May June July mid Oct and Oct not severe Dec. dry in North	End of Aug to Jan.	22-26	60.29" slight	64,231	1915-16
1916 23-30 Jan.	Long, late and very severe mid- June	Aug 19- 24 and Nov. 9- 12	No dis- tinct Indian Summer	10-22 Dec.	63.68" Very Slight	70,891	1916-17
1917 11-23 Dec.	Long and Severe	July wet Slt floods in Aug	Oct dry especi- ally be- ginning	23 Jan to 4 Feb	63.41" Very Bad	45,256	1917-18

and remained there for several months until they developed wings. The adult then fed upon the cane stalk and leaves, causing a streaking effect, due to breakdown of leaf tissue.

There were continuous cycles of egg laying and eggs were of two types - short season as above, and long season which could survive the dry season and hatch when the wet season arrived. There was considerable reduction in yield if attacks were bad particularly on ratoons, and was usually worst in August and September. A direct correlation was observed between soils, precipitation distribution, and cane varieties. (Table 27)

The relationship of weather variations to the prevalence and severity of blight following froghopper attacks was examined by C.B. Williams in 1919.¹¹ He found that generally, blight was worse following an usually wet season, and particularly pronounced Indian Summer, especially if this was preceded by heavy rains in the early part of the wet season (Table 27). Between the years 1906-1924, froghopper attacks in Trinidad were very serious especially in 1912 and 1917 when the dry seasons were exceptionally long and severe. There was an estimated loss of 76,632 tons of cane on 19 estates (Table 28) and great losses were also suffered by small peasant farmers.

Charter and Turner found that the liability of sugar

¹¹ Williams, C.B., "Rainfall, Sugar Production and Froghopper Blight in Trinidad", Bulletin, Department of Agriculture, Trinidad and Tobago, 1919, Vol. XVIII, pp. 153-157.

TABLE 28

SUMMARY OF DAMAGE OF FROGHOPPER OUTBREAKS 1912 and 1917

ESTATE	1912		1917		Estimated Loss of Cane Tons
	Severe Acres	Slight Acres	Severe Acres	Slight Acres	
<u>NORTHERN SECTION</u>					
Caroni	1,460	397	260	770	5,000
Orange Grove	69	75	n.f.	n.f.	
<u>CENTRAL SECTION</u>					
Woodford Lodge	603	208	243	229	6,750
Waterloo	164	763	487	440	12,000
Exchange Group	937	623	1,260	60	20,641
Brechin Castle	350	350	470	70	12,000
Esperanza	290	186	n.f.	n.f.	-
Forres Park	15	30	n.f.	n.f.	1,500
<u>SOUTHERN SECTION</u>					
Plein Palais	41	73	Included in Union Hall		
Harmony Hall & Tarduba	125	327	153	258	3,794
Reform	30	110	2	28	200
Williamsville	Nil	15	2	3	10
Craignish	-	-	10	55	200
Hindustan	-	-	29	3	1,000
Malgretout Group	153	94	Nil	Nil	Nil
Cedar Hill	40	190	27	109	2,000
Petit Morne	500	100	50	275	2,600
Union Hall	90	729	-	91	657
Picton & Wellington	171	192	10	70	1,300
Hermitage	70	50	308	217	3,500
La Fortunee	35	83	203	119	3,500
	5,143	4,588	3,514	3,426	76,632

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Memoirs of the Dept. of Agriculture, Trinidad & Tobago, No. I.
C. B. Williams - Report of the Froghopper Blight in Sugar Cane
in Trinidad, Gov't Printing Office, Trinidad, British West Indies, 1921,
170 pps., sec. 3, p. 38.

cane to froghopper attacks was dependent on the suitability of the soil to oviposition and that the recovery from froghopper damage was dependent on the fertility of the soil (with special reference to lime status), on natural drainage and on the capacity of the soil to supply moisture during the rainless periods.¹²

Turner, in an independent study found that continuous cropping as in Trinidad, together with high rainfall tended rapidly to exhaust the soil of absorbed lime.¹³ His results indicated that as the degree of saturation of the soil with lime decreased, the intensity of the blighting increased (Tables 29 and 30)

SOILS OF THE NAPARIMA DISTRICT

TABLE 29

Soil Type	Froghopper Record	Degree of Saturation with Lime
(1) Naparima Marl	Blight Free	Adsorptively Saturated
(2) New Alluvial	Blight Free	Adsorptively Saturated
(3) Old Alluvial	(a) " "	(a) " "
	(b) Badly blighted	(b) 51% saturated
(4) Red	Blighted	45% saturated
(5) Brown	Blighted	60% saturated

TABLE 30

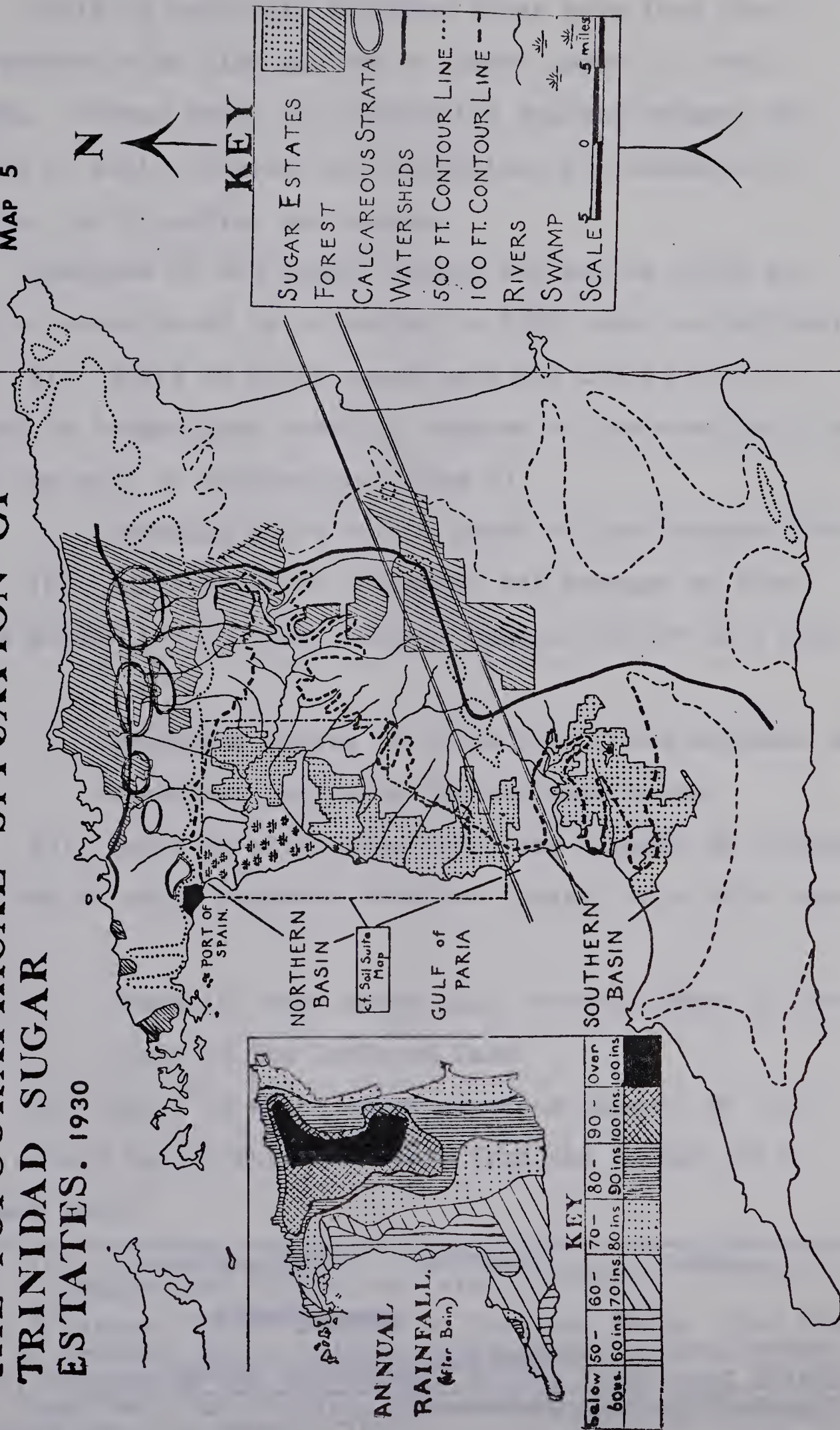
CORRELATION BETWEEN THE DEGREE OF BLIGHTING AND OF SATURATION -

WATERLOO ESTATE CANE VARIETY B.156 - 1st RATOON

Index No. of Soil	Degree of Saturation with Lime (%)	Soil Content Toxic Alumina (%)	Degree of Blighting	Yield per Acre (Tons)
W.O.A. 320	58.5	Nil	Slight	25 $\frac{1}{4}$
W.O.A. 339	46.6	0.03	Slight	25 $\frac{3}{4}$
W.O.A. 332	38.7	0.02	Moderate	21
W.O.A. 295	8.5	0.06	Very Bad	3
			Recovery Poor	
W.O.A. 272	18.9	0.08	Canes Wiped out	1
			Fields abandoned	

THE TOPOGRAPHICAL SITUATION OF TRINIDAD SUGAR ESTATES. 1930

MAP 5



10° N

61° W

Soils of regularly blighted areas were less than 60% saturated with lime and had a larger amount of toxic aluminum. Turner found no correlation existed between the presence of toxic aluminum and blighting, yet wherever it appeared, the blighting was severe.

Examples of the actual suites and series which resisted or contributed to blighting in 1930, were as follows:¹⁴

(1) Soils on which sugar cane was not as a rule attacked by froghoppers possibly because of the unsuitability of the top soil to oviposition. (Map 5)

Devenish Suite on the south of the Northern Basin.

(2) Soils on which sugarcane was damaged by froghoppers attack but on which serious damage did not as a rule follow:

Tacarigua Series in the north of the Northern Basin.

Hermitage Series in the Southern Basin.

(3) Soils on which sugar cane was damaged by froghopper attack but on which recovery from the damage, as a rule, was good:

Frederick Very Heavy Clay, Neutral Phase in the north of the Northern Basin

(4) Soils on which sugar cane was damaged by froghopper attack but on which recovery from the damage, as a rule, was poor:

¹² Charter and Turner, op. cit., p. 75.

¹³ Turner, P.E., "Studies on Trinidad Soils - The Lime Status of Trinidad Soils and its Relationship to Froghopper Blight", Minutes of the Proceedings of the Froghopper Investigation Committee, Vol. 1, Nov. 1925 - Dec. 1927, Port-of-Spain, Government Printing Office, 1928.

¹⁴ Ibid., p. 291.

Washington Series (especially the shallow phase)
 Orange Grove Series (" " " ")
 Frederick Very Heavy Clay, Acidic Phase
 Ste. Madeleine Heavy Clay in the Southern Basin
 (Table 25)

Varieties and Froghopper Attacks

The attack of the blight led to the widespread cultivation of the hardy canes, especially Uba. Uba is a deep-rooting cane, which covers the ground well and prevents the growth of grass. It is not a self-thrashing cane which means that no accumulation of trash occurs, which is the favourite hiding and breeding place for froghopper nymphs. Depending on the soil areas on which it was planted, Uba was occasionally attacked by blight, but was the first variety to recover. Ratoons of all varieties suffered more than plants, since they were exposed to attacks over a period of years. The variety B. 156 suffered very badly in many localities (Tables 29 and 30) and had to be abandoned.

The increased cultivation of noble canes from 1937 onwards is worthy of note. By this time the effects of froghopper attacks had subsided considerably, and hardy canes had been grown in the past under great disadvantages. It is important to note that a greater weight of hardy cane than noble cane is needed to make a ton of sugar (Table 31 and Figures 2 and 3).

FIG. II - CANE YIELDS

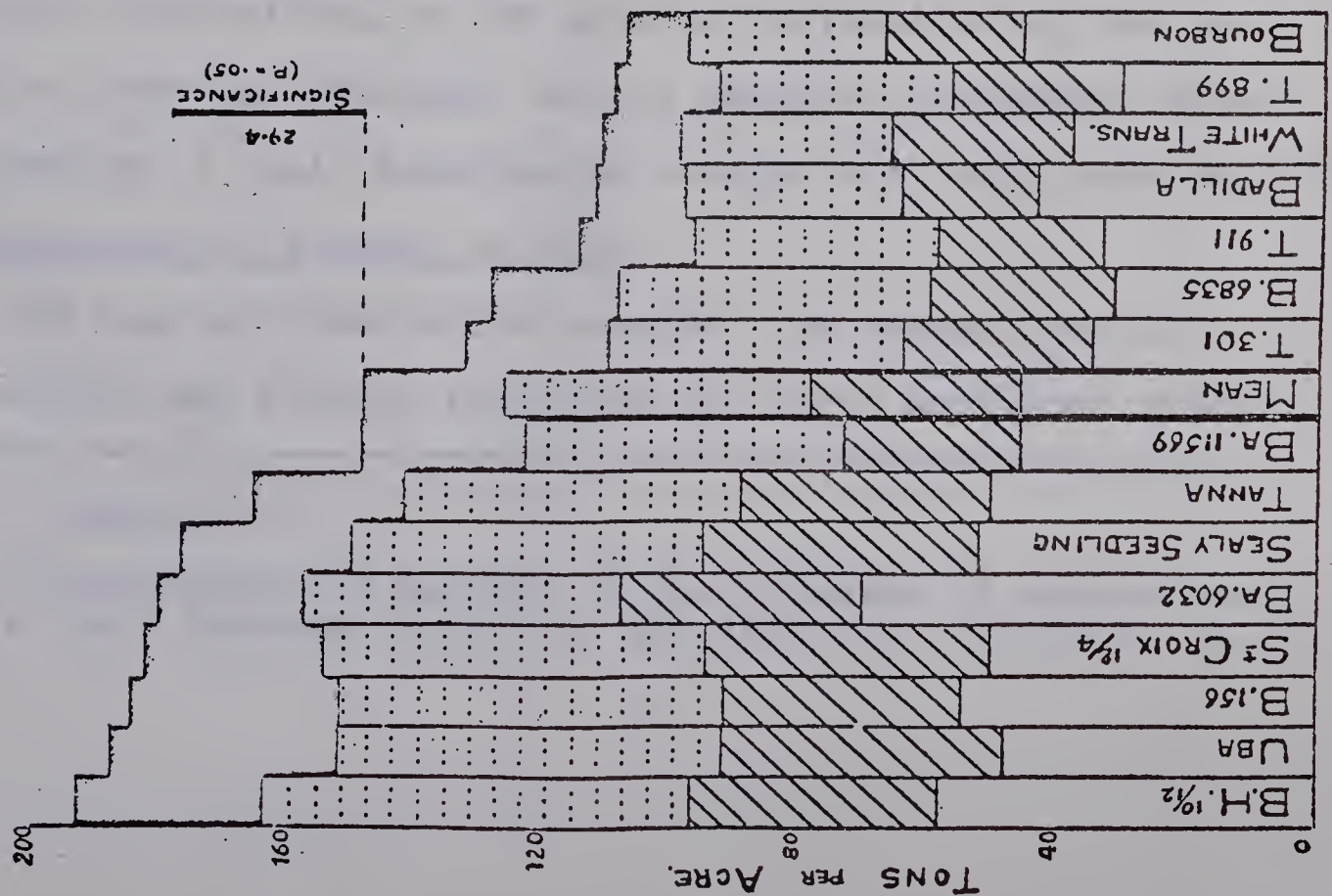


FIG. III - SUGAR YIELDS

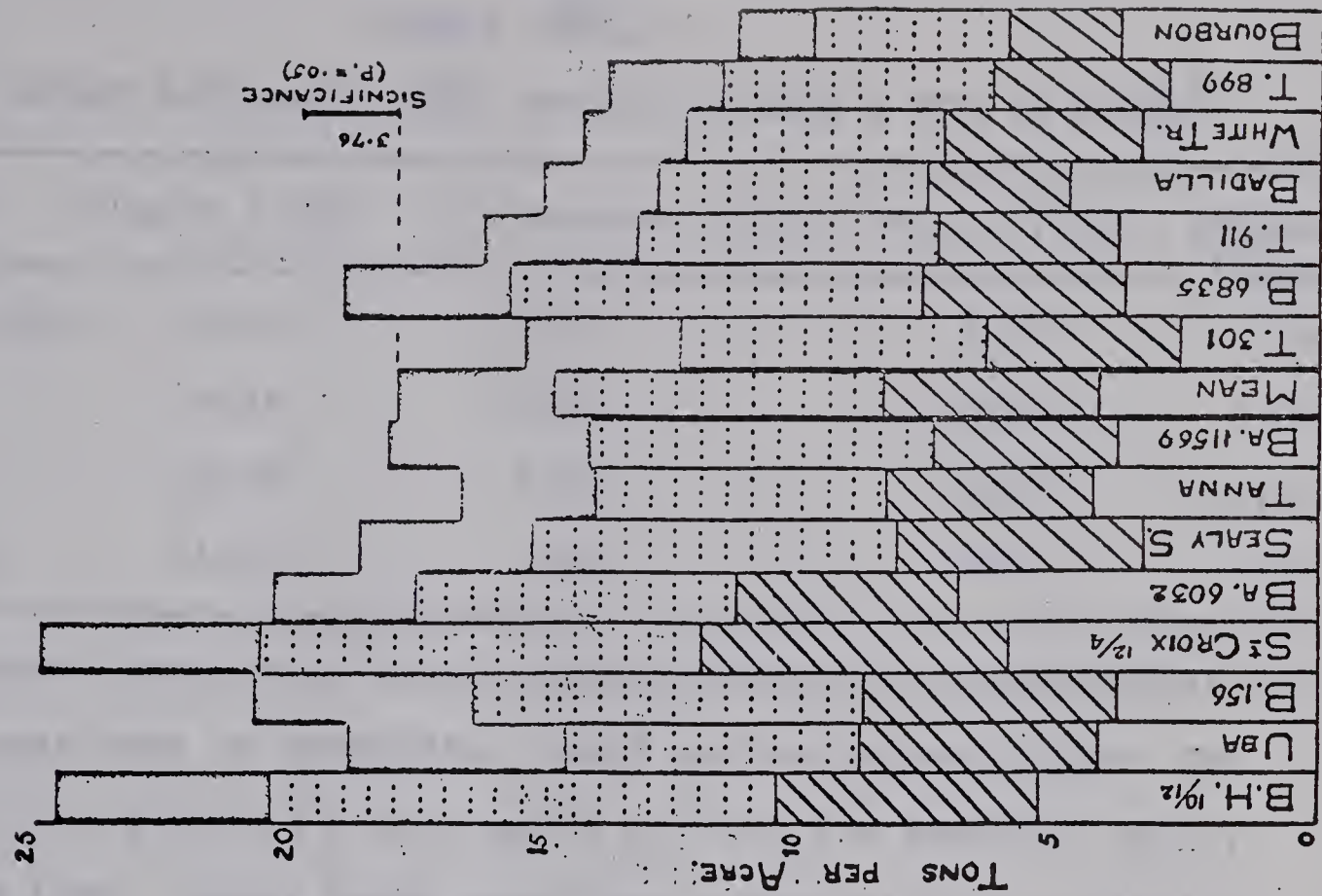


TABLE 31

TONS OF NOBLE AND HARDY CANES NEEDED TO MAKE A TON OF SUGAR¹⁵

Variety	Plants (1936)	1st Ratoons (1937)	2nd R. (1938)	Average Value
B. H. 10/12	10.14	8.40	8.28	8.94
B 726	9.14	8.10	8.05	8.43
Uba	12.31	9.35	9.38	10.35
Co 213	11.45	9.08	9.45	9.99

Furthermore, because of these non-self-thrashing characteristics, hardy canes were of necessity, burnt before harvesting and the value of the trash as a soil mulch and for its manurial value, was thus lost. Also, hardy canes had poorer milling qualities than noble canes.

Between 1936 and 1938 the proportion of the total area under noble canes rose from 54% to 60% (Table 23). The change was due in the main to continued improvements in methods of preparatory cultivation, to the greater realisation of the importance of thorough drainage, and to manurial programmes based on the results of field experiments coupled with soil knowledge.¹⁶

The Amalgamation of Estates to 1930

The many problems which prompted the change towards larger estates and central factories have been mentioned before.

¹⁵Ibid., p. 2.

¹⁶Administration Reports of the Director of Agriculture, Trinidad: Soil Surveys, 1935 - p. 53; 1936 - p. 61; 1937 - p. 7.

Poor land management and cane cultivation methods are understandable since the desire of all planters was to make a quick profit, in the easiest possible way. The history of estate management in Trinidad to the end of the nineteenth century, is characterised by the lack of systems and knowledge in cultivation and technology which prevailed. The knowledge of the sugar cane proprietor was best summarised by Anderson who said "..... in Trinidad, a planter was made in a day".¹⁷

The relatively easy access to money by the young English planter coupled with the lure of profits on the sugar market were stimuli which proved to be illusory. These stimuli eventually accounted for the collapse of many smaller estates around 1884, due to the depression in the British West Indies sugar sales abroad.

Table 32 illustrates the tendency towards the establishment of new estates, and eventually themove towards larger plantations and company ownership.

TABLE 32

SUGAR ESTATES AND SUGAR COMPANIES 1797 - 1966¹⁸

Estates (Individual)

1797	1801	1807	1840	1865	1887	1896	1897
159	192	214	180	154	90	56	39

Estates Companies (Amalgamations)

1900	1905	1910	1930	1940	1950	1960	1966
21	17	14	10	9	6	5	3

¹⁷Three Essays, op. cit., p.225.¹⁸Various sources.

TABLE 33
ESTATES, PRODUCTION AND ESTATE AMALGAMATION 1878-1900 - BY DISTRICTS

CARONI	1878-9	1885-6	1890-1	1895	1900	CHOP IN HOGSHEADS (1HM=2000)	ESTATE OWNERS
Bonaventure	760	462	465				
Carcas	232	300	375				
Spring	440	-					
Milton	459	295	431				
Fred McLeod Plain	1270						TRINIDAD ESTATES LIMITED
Washington	2500	2183	3603	3770			
Caroni							
St. Helene							
Brechin Castle	2805	3030	2050	3906	3000		
Rivulet							
Estevanza	936	1161	2800	3132	2350		HENDERSON & CONNELL
Providence							
Perseverance	860	746	779	927			
Camden	1920	1661	1021	1045			J. CUMMING
Exchange	602	693	1357				
Felicitie							
Waterloo	950	1720	1849	2848	3919		
Concord	558	351	508				
Woodford Lodge	500	762	640	3375	2540		S. HENDERSON
Edinburgh	536	432	165				
Trafalgar	600	655	196				
Perseverance	603	648	440				
Endeavour	637	630	521	406	360		R. DE VERTEUIL
Mon Plaisir	202	587	1041	1525	1239		
St. Clair	317	244					L. BERT de LAMARRE
St. Charles	100	125	550				
Mon Valoux	400	495	613	530	750		SCHUMALIN & COMPANY
Mt. Pleasant							
Forest Park	1342	834	1162	1056	953		NEW COLONIAL COMPANY
Cedar Hill							
Diamond	168	120					
Orange Field							
Petersfield	657	850	706	800			
Plaisance	570	321	706				
St. Marie	143						
Terre Promise	508						
Wilderness	197	224					J. W. WARREN
Leonice	151	138					
Reform	120						
Adela	500						
ST. GEORGE	1190	759	1416	2300	540		
Aranquez							
Barataria	405	352					
Bon Air	375		580	1975	720		(Approx)
Garden							
San Clair							
Lauai Hill	804	420	383				L. BERT de LAMARRE
Cane Farm							
Macova	616	713					
El Dorado	2260	4200	4120				
Orange Grove	1573	1502					
Woodbrook	320	253					
Champs Elysses	60	43					
Curepe	660						
El Socorro	717	814	662				
Dinsley	970	600	500	675			
Paradise	495	200					
Golden Grove	516	344					
La Florias Ante	249	121	270	160			
Laurentille	195	80					
Ste. Claire	407	510					
Hiver							
Cascade	216	350	208				
Diamond							
St. Augustin	532	2300	1255	2270	869		
Streatham Lodge	282						
San Cil	256						
Valsaun							
Caroni	1871	1250	817				
ST. PATRICK							
Arripero							
Nelson	200						
Belle Vue	565	351	349	406			
Colombia							
Lochmaren	253	265					
L'Envilevre	260	118	340	256			
Mon Desir	272	303	443	437	390		
La Retraite	348		293	104			P. HERRERA
Mon Plaisir							
St. Marie							
Beaulieu	845	813	581	329			
Othelie	303	300					
Perseverance	355						
St. John	340						
VICTORIA							
Monte Aventure							
St. John							
Perseverance							
Othelie							
Beaulieu							
St. Marie							
Mon Plaisir							
La Retraite							
Mon Desir							
L'Envilevre							
Lochmaren							
Colombia							
Belle Vue							
Nelson							
Arripero							
ST. PATRICK							
Caroni							
Valsaun							
Caroni							
St. Augustin							
Streatham Lodge							
San Cil							
Valsaun							
Caroni							
ST. PATRICK							
Arripero							
Nelson							
Belle Vue							
Colombia							
Lochmaren							
L'Envilevre							
Mon Desir							
La Retraite							
Mon Plaisir							
St. Marie							
Beaulieu							
Othelie							
Perseverance							
St. John							
Monte Aventure							
VICTORIA							

St. Augustin	532	2300	1255	2270	869
Streatham Lodge	282				
Sam Gil	256				
Valsayn					
Caroni	1871	1250	817		
ST. PATRICK					
Antipero	200				
Nelson					
Belle Vue	565	351	349	406	
Columbia					
Lochmaren	253	265			
L'Knvlevese	260	118	340	256	
Mon Deslr	272	303	443	437	390
La Retrame	348		293	104	
Mon Plaisir					
St. Marce	845	813	581	329	
Beaulieu					
Otaheite	303	300			
Perseverance	355				
St. John	340	520	1003	1144	347
F. HERRERA					
C.D.K. WELSH					
VICTORIA					
Bonne Aventure					
Ben Lomond	574	405	536	1125	509
La Fortunee	1688	1400	2087	2300	1727
Blen Venue					
Friendship (T)	532				
Friendship (R)	495	314	1218	2213	1851
Glencoy	701	1255			
Malgretovt					
Buen Intento	700	610	820	983	
Broomage	501				
New Grant	304	466	550		
Hermitage	444	360	491	876	1166
Concord Caven	667	464	780		
Jordan Hill	730	570	810	692	1105
Bronte	908	670	865		
Cupar Glange	510	345			
Phillipline	453		2635	1785	
Canaan	650				
Palmitte	417				
Cedar Grove	631		2550		
La Resource	362	264	232		
Corral	240				
Craigish	565	327	540	675	400
George Liddlelow					
Fairfield	574	367	192		
Garth	544				
Hope	50		40		
Hindostan	133	268	275	560	365
W. S. ROBERTSON					
Inverness	699	561	814	987	647
Lothians	862	373		560	540
THINIDAD ESTATES LTD.					
La Fortitude	540	560	602	1446	670
W. SANDERSON					
New Grant	304	466	550	With Broomage	
Palmyra	380				
Ferndalse	143				
Plaisance	683	600	448	400	
Retrench	361	789	617		
Sta. Margaria	458	300			
Vistabella	195				
Elswick					
Wellington	2242	2264	2110	1405	1000
Picton	25				
Dumfries					
Esperance	282	285			
Woodlands	828				
Woodford Dale					
Harmony Hall	705	833	422		
Plein Palais	589	318			
Tarouba					
Williamsville	1010	974	1072	11511	8250
Brothers					
Union Hall	233				
Petit Morne					
Colcomda					
Cedar Hill					
Les Efforts					
Retrench	361	289	617		
Union	870	300			
Marebella					
St. Madeleine	5340	5956	7227		

Williamsville

Brothers

Union Hall

Petit Morne

Colcomda

Cedar Hill

Les Efforts

Retrench

Union

Marabella

COLONIAL
COMPANY

1010 974 1072 11511 8250

233

361 289 617

870 300

There was general expansion into virgin lands with the settlement schemes of the early nineteenth century. The period around 1840 to 1865 marks the initial crises of labour and many estates were forced to close. The years 1865-1883 were prosperous ones for British West Indies sugar cane proprietors and marked the beginnings of estate amalgamation. By this time too, the centre of sugar cane cultivation was firmly established in the Naparima lowlands of the Southern Plains, having shifted from the original northern areas of cultivation. The influx of people, and the acquisition of marginal cane lands by freed slaves and contract-free Indians, forced proprietors in these marginal areas to sell their estates as house lots (Table 33).

By the mid-nineteenth century too, the processes of trial and error in cane cultivation in Trinidad, had proved that the lands of the Naparima region were best suited for the cultivation of sugar cane. As a result very few estate owners in the northern region could now compete with the more profitable estates south of them.

A shift in the centre of cultivation, and amalgamation and abandonment of estates did not mean a great decrease in the area cultivated to sugar cane. In 1797, the 159 estates were cultivating 37,960 acres in sugar cane, while in 1930, the area cultivated was 32,874 acres.¹⁹ The decrease in acreage without fall in output is explained by the tendency towards

¹⁹ Sugar Commission 1930, op. cit., p. 105.

better cultivation methods and higher yields, on more productive and maintained soils. (Table 33: Note, table divided into Districts)

One of the recommendations of the 1897 Royal Commission Report was the establishment of large central factories to cope with the manufacturing aspect of the sugar cane cycle from the field to factory. Prior to this date similar recommendations were made by less illustrious bodies, but it was against the desires of the proprietors to be deprived of the honour of being complete lord and master of his little manor. Cane growing countries, especially Cuba, which had already established centrals and separated the field and factory processes, had shown the sugar cane world that this was the only effective and economical system to adopt.

The large plantation organisation had certain definite advantages for cane production. The easier access to capital permitted better yields from crops since labour, machinery and fertilisers, could be easily paid for or bought. Manufacturing costs were reduced by research into cane varieties with superior milling qualities rather than mere cane tonnage per acre.²⁰ There was also better coordination between field and factory in transporting canes, and good management eradicated the problem of stale canes or cut canes left more than 24 hours in the field. Good transportation facilities and good relationships with peasant farmers assured a steady

²⁰ Timoshenko, V. and Swerling, B., The World's Sugar, Progress and Policy, Stanford: Stanford University Press, 1957, 364 pages, p. 72.

supply of canes to the mills, but local difficulties often disrupted this coordination. In the large plantation system, it was possible to make large investments in milling machinery, capable of producing greater quantities of sugar per day. Thus the salient factor which assured good financial returns for the large plantation, was good management and organisation.

In 1884, Trinidad had 88 sugar factories in operation.²¹ Outputs varied from Champ Elysses with its 8 tons of sugar to Usine Ste. Madeleine with its 6,100 tons of sugar. A large scale sugarproprietor James Lamont, commented in 1884 on the "smell of muscovado sugar carried on every breeze" and the country side "dotted in every direction with little sugar works, each with its smoking chimney and its yard filled with half crushed canes laid out to dry in the sun".²² In 1889, the 88 factories produced 53, 410 tons of sugar but with the change towards amalgamation, the number of factories reduced to 13 in 1927, producing 51,982 tons.

The 14 years from 1894-1907 were disastrous ones for the Trinidad cane planter, owing chiefly to the effects of beet sugar on the world market. Because of resulting financial difficulties, and continuous losses incurred, "there was scarcely a sugar factory in Trinidad which did not change hands".²³ Small proprietors were forced to sell their lands

²¹ Lamont, N., Problems of Trinidad, A collection of Speeches and Writings on subjects connected with the colony, Trinidad: Yuille's Printerie, 1933, p. 225.

²² Ibid., p. 226.

²³ Ibid.

to larger concerns, who could operate on a large scale.

As a result, in the period 1894-1907, the major take-over of small estates by sugar companies and wealthy individuals was accomplished. The establishment of large plantations was now a reality in Trinidad and the small proprietor realised that large, efficient and well organised plantations were the only concerns which could successfully compete with beet sugar on the world market. In 1900, the major companies were The New Colonial Company (24 estates), Trinidad Estate Limited (10 estates), Sir Charles Tennant's Estate (13 estates), L. Bert de Lamarre (12 estates) and Gordon Grant and Co. Ltd. (Table 33)

The Ste. Madeleine Sugar Company

By far the most important acquisitions were those of the New Colonial Company, later called the "Usine Ste. Madeleine Sugar Company." These estates were nearly all located in Victoria County in the sugar growing district of Naparima, Usine Ste. Madeleine became the major processing factory and maintained this importance to 1956, when it was acquired by a later major concern, the Caroni Sugar Company.

So important was the Ste. Madeleine Sugar Company to the history of sugar in Trinidad in the early twentieth century, that it is used here as an example to illustrate the field-factory processes that were taking place by 1938. Table 34 compares the Ste. Madeleine's sugar production with that of the island's, emphasising the importance and gain in strength of the Company to 1930.

By 1928, the Company owned 24,500 acres of land (Map 6) of which 11,500 acres were under estate cultivation, 6,000 rented to cane farmers, 5,700 uncultivated and the remainder consisted of pastures and traces.²⁴ Cane for processing was also received from a considerable number of small farmers who cultivated their private plots in the vicinity of the estate's lands.

The estate planted 2-3,000 acres under cane, annually, principally between August and November, during the wet season. The canes were reaped, as they still are, 15-18 months later and then cut annually thereafter as ratoons for a variable number of years. The varieties D. 625 and B. 156 gave way to B.H. 10/12 and Uba, for reasons previously explained. It was the policy at this time, as on other estates in Trinidad, to replant after the second ratoon (Table 35) except in the case of Uba which offered more resistance to froghopper blight in ratoons.

TABLE 35

PLANT AND RATOON CANES²⁵ - Average Acreage Division in 1925-1926

	Acres	Percentage of Total Area
Plants Reaped	2,622	35.0
1st Ratoons	2,615	35.0
2nd "	1,459	19.3
3rd "	395	5.3
Remaining Ratoons & Standovers	407	5.4
Total	7,498	100.000

²⁴ Shepherd, C.V., The Sugar Industry of the British West Indies and British Guiana with Special Reference to Trinidad, Memoirs of the I.C.T.A. Trinidad, Economic Series No. 1, May, 1929, p. 10.

²⁵ Ibid., p. 11.

TABLE 36

ESTATE	TOTAL SUGAR MADE (TONS)				TONS OF SUGAR MADE FROM ESTATE CANES				TONS OF ESTATE CANES GROUND				TONS OF CANES PURCHASED				AMOUNTS PAID FOR CANES (DOLLARS)				EAST INDIANS				WEST INDIANS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
	1905	1910	1915	1920	1925	1930	1935	1940	1945	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	2015	2020	1905	1910	1915	1920	1925	1930	1935	1940	1945	1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000	2005	2010	2015	2020																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Brechin Castle	3,230	4,445	4,260	3,700	4,160	3,574																			1,887	6,793	7,111	13,501	12,136	8,295	6,367	15,492	18,789	29,333	37,383	24,781	100	239	300	479	586	432	276	176	280	403	339																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
Bronte	1,750	3,300	3,570	3,170	4,111	4,180																			11,361	15,754	21,339	21,250	22,706	20,440	35,172	35,372	57,126	153,001	68,117	58,845	536	528	806	760	662	853	204	184	314	248	176	144																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Caroni	3,960	4,585	5,183	5,300	6,060	5,825																			7,579	16,010	37,781	32,650	29,427	25,549	24,276	36,503	103,657	23,850	90,795	80,849	196	339	697	1,500	911	653	286	317	495	930	438	137																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Orpignish	450	615	732	970	925	876																			3,566	4,987	6,960	8,126	7,563	8,410	12,722	11,260	18,374	63,721	24,770	24,214	187	252	232	1,050	585	168	121	1,188	212	1,153	391	247																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Usine Ste. Madeline	8,711	14,486	17,067	17,510	23,520	31,500																			35,677	40,218	59,340	86,344	83,045	97,400	120,908	104,063	155,844	614,489	239,159	283,687	1,571	2,088	3,019	4,393	3,455	4,171	1,244	1,352	1,189	2,778	2,188	1,914																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Esperanza	1,730	2,400	2,243	2,365	3,133	3,004																			7,629	5,014	16,358	16,390	15,402	9,104	25,584	11,414	43,135	150,965	46,206	26,216	195	174	384	607	488	597	179	182	186	380	283	229																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Forres Park	890	1,630	1,450	2,301	1,937	1,828½																			10,511	12,462	12,285	12,147	10,066	10,038	35,317	28,309	32,434	107,634	30,323	28,910	337	405	450	550	535	612	166	123	166	194	218	178																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Hindustan	463	529	800	1,043	916	880																			2,764	5,647	8,436	8,758	7,584	8,331	9,217	12,847	22,273	69,363	25,482	23,993	78	65	105	304	180	195	297	150	153	368	518	641																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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CANES (DOLLARS)				E	
1915	1920	1925	1930	1905	1910
789	129,333	37,383	24,781	100	239
126	153,001	68,117	58,845	536	528
557	293,850	90,795	80,849	196	339
374	63,721	24,770	24,214	187	252
344	614,489	239,159	283,687	1,571	2,088
135	150,965	46,206	26,216	195	174
434	107,634	30,323	28,910	337	405
273	69,363	25,482	23,993	78	65
-	-	-	-	-	6
308				43	50
	48,430		75,158	181	-
474	276,273	95,451			
-	-	-		244	-
-	-	-		37	-
708	91,274	23,393	18,581	530	300
267	106,293			762	1,081
531	212,692	172,674	176,017	325	437
540	607,086	139,308	70,652	102	94
790	2924,404	111,094	894,910	5,425	6,443

After indentureship was discontinued in 1917, sugar companies were faced with the problem of keeping their labour on the estates, and their methods of inducement were to lay out house lots, and provide facilities for the cultivation of cane by peasant cane farmers. New areas not owned by the Company were opened up, and labour saving methods such as cane hoists, were introduced. As a result, by 1930 more than 40% of the cane crushed by the factory was supplied by these farmers (Table 36).

Farmers had, and still do have a tendency to quit the cultivation of sugar cane when prices are not good. The year 1922 and 1923 (Table 34) were good examples of poor returns, after the slump in sugar prices in 1921 (Table 34). To avoid wasteful competition, eliminate unnecessary haulage, and facilitate the recovery of monetary advances made to the farmers, the sugar estates agreed in 1922 to "restrict the purchase of cane within defined areas, and to adopt a common sliding scale of payment".²⁶ To encourage farmers the Company established a presumed, though not guaranteed, minimum price of \$2.88 per ton of cane and improved the conditions of land tenure.

Apart from small farmers canes, Usine Ste. Madeleine also obtained canes from Sir Charles Tennant's Estates (Table 36). This method of obtaining canes from nearby farmers, was practised in other parts of Trinidad, especially the factories at Tacarigua, Caroni, Woodford Lodge, and Waterloo (Table 36).

²⁶Ibid., p. 12.

FIG 4

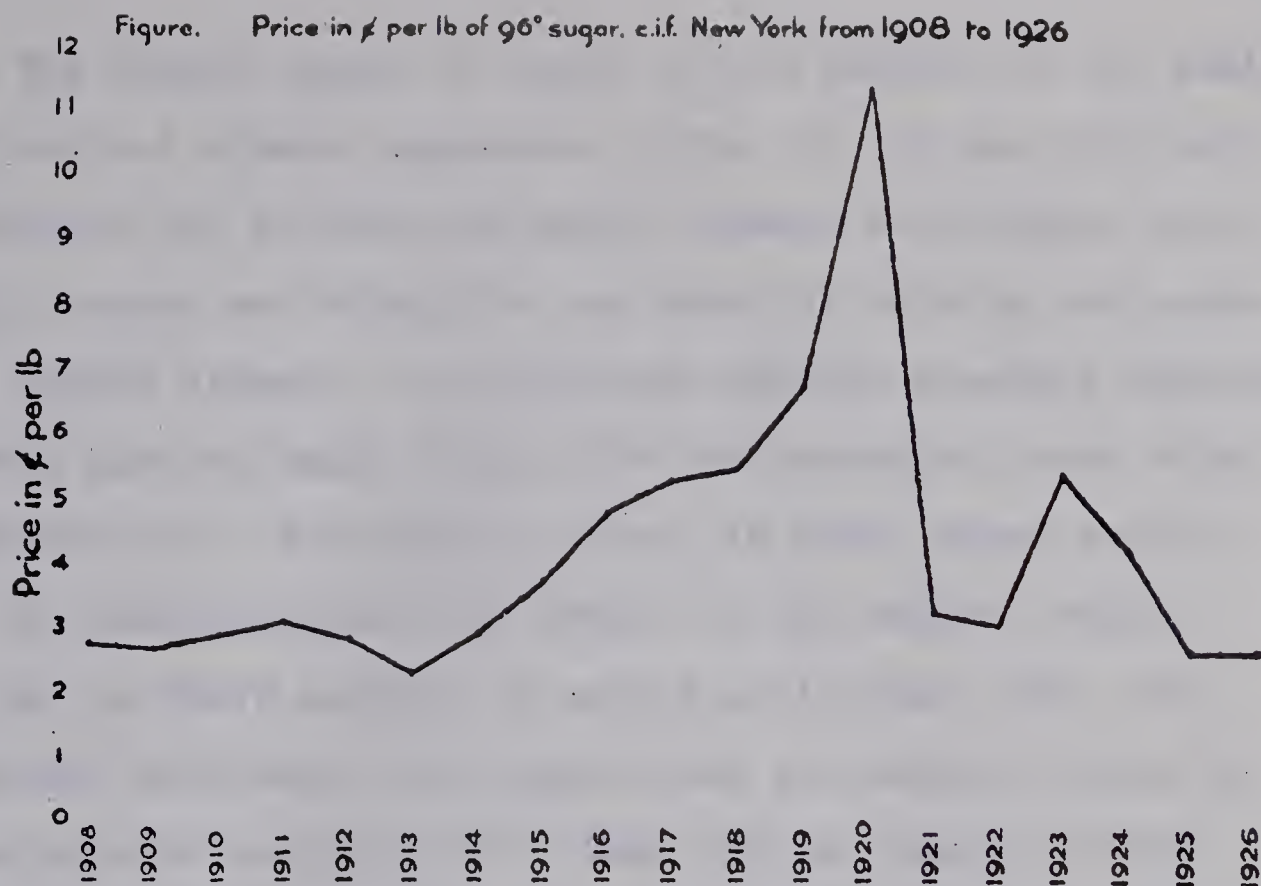


Figure 4 — Note the rapid rise in price during the war, followed by the post-war boom when sugar rose to an exceptionally high level. The sudden fall in 1921 brought disaster to many sugar producers.

FIG 5

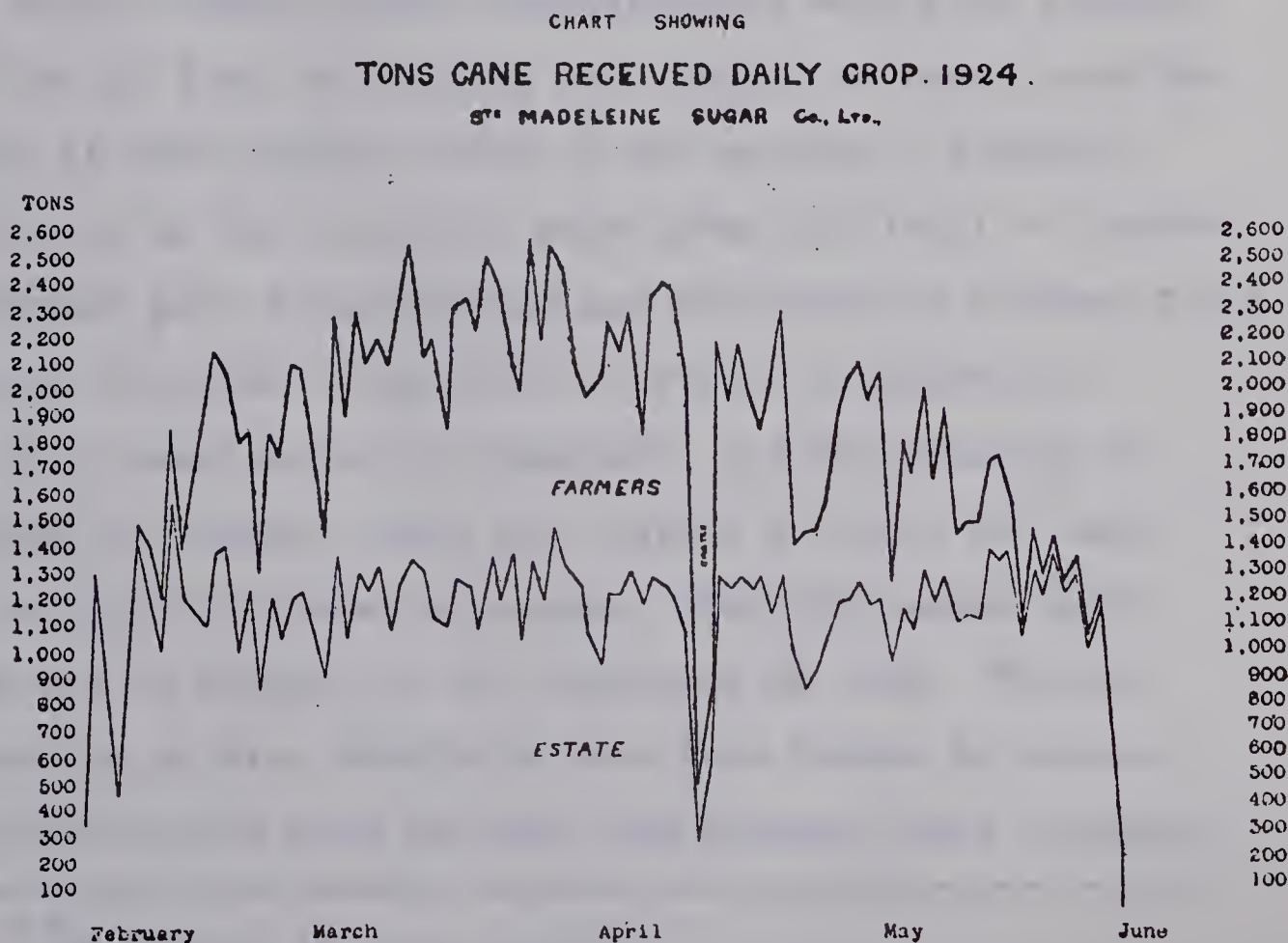


Figure 5 — Apart from small daily fluctuations the delivery of estate cane remained relatively uniform. The supply of farmers' cane varied considerably.

The steady supply of canes to the factory by the small farmers was not always guaranteed. (Fig. 5) It was difficult to coordinate the factory and small farmers activities, since the small farmer was always in the habit of cutting his canes when it suited himself. As mentioned before, monetary advances were often made to small farmers by the factories, when sugar prices were good. For example, when, in 1920, sugar prices reached an unprecedented high (Fig. 4), the various sugar companies, in their anxiety to secure additional cane, "advanced money recklessly and established purchasing scales in their neighbours' territory".²⁷ When prices slumped in the following year the small farmers simply grew less canes, thus disrupting the expected supply of canes to the factories.

Factory-small farmer relationships were also plagued by the loss in time in weighing and transit of canes, and the assurance of good quality canes to the factory. Monetary advances made by the factories were often difficult to recover and continued good relationships and coordination between field and factory are even today still difficult to maintain.

The organisation of transport, for the transfer to the factory of peasant canes was limited to about 100 days during the dry or harvesting season. The dry season lasts from the end of January to the beginning of June. The two mills working at Ste. Madeleine were thus forced to process 2,500-3,000 tons of cane per day, and factory costs increased

²⁷ Shepherd, op. cit., p. 11.

rapidly with diminished deliveries of cane. In 1930, 44% of the 5,000 to 6,000 farmers produced less than 5 tons each, and 80% less than 20 tons each, and the evenness of the supply of the cane to the factory was difficult to maintain. (Fig. 5) Other factories faced similar problems coupled with the problem of uncertain replanting of farmers lands, depending on the previous years prices.

Cultivation Practises

Up to around 1920, the use of tractors in the preparation of land in Trinidad for sugar cane cultivation, was unheard of. The heavy nature of the soils, especially in the Naparima district, prevented cattle ploughing, and the undulating land prohibited the use of steam cable ploughs, so that preparation for planting had to be accomplished in the wet season with hand labour. In 1924, three 60 horsepower tractors were introduced into Ste. Madeleine, each tractor drawing a four furrow plough furnished with 28" discs, or with chisels or knives.²⁸ This enabled preparation for planting to take place in the dry season (Table 37) but up to 1930, their effective use in this phase was still the exception throughout the island.

TABLE 37

WORK DONE BY TRACTORS AT STE. MADELEINE²⁹, Dry Season - 1928

<u>Acres</u>	
1,372	ploughed
570	graded or round ridged
190	unploughed fields chiseled
131	unploughed fields chiseled a second time
136	chiseled after ploughing
21	drilled
<u>Miles</u> 38	roads and traces graded

After the land was prepared by hand, whole canes about three feet long were laid in furrows and covered lightly by hoe with soil.³⁰ These plants were obtained from a special crop planted the previous November, while the main planting season ran from June to September. Short pieces were also planted with the aid of hand picks and the planting and reaping processes all used hand labour.

Shortly before or after planting, one to five chemical weed control applications were made, dependent on the danger of blight, and the chemical was applied by hand-operated sprayers with low volume nozzle sprays. The use of artificial fertilisers was still not practised owing to the prohibitive cost of the fertiliser. The alternative "pen" manure was widely used, and applied by hand before or after planting. About 20 tons per acre were needed on Ste. Madeleine's lands and animals on all estates were penned when not working, to obtain this valuable fertiliser source. After 4-8 weeks, the plants were moulded, or the dirt and manure around the root, heaped on the root, acting as a weed control. Depending on the soil type and cane variety, weeding were often necessary and up to three weeding were a regular feature on some estates.³¹

²⁸Ibid., p. 12.

²⁹Ibid.

³⁰Ste. Madeleine Sugar Company Ltd., Trinidad: 47 pages, p. 3.

³¹Ibid., p. 4.

With the introduction of the tractors in 1924, contour ploughing was practised as the most effective method for draining the land of the excess precipitation, and preventing soil erosion. In flatter areas, the normal bed pattern was used with large drains on the sides to collect run-off.

In cultivating ratoons, the residual trash and cane tops which were left after reaping, were placed around the cane shoots by hand and manurial applications made as for plant canes. Weeding and trashing the canes by hand were also necessary, while drains were constantly kept clean to prevent the rotting of ratoons by drain overflow water. It was also the practice to plant the cane banks with Sword Bean (Canvalia ensiformis), Sun Hemp (Crotalaria junces), or Wooly Pyrol (Phaseolus mungo), usually an early or late maturing variety on alternative banks. These were turned into the soils as the banks were required for moulding the cane.³² Fields that were ploughed, but not required for plantings for periods up to three months, were planted with Sun Hemp or Wooly Pyrol to provide quick cover to keep down weeds and prevent erosion. Nearly all of these cultivation and harvesting methods were practised on plantations throughout the island, except where local differences such as lighter soils, eliminated the number of weedings.

Harvesting and Transportation

Up to 1930, the main modes of transportation of canes to the factory utilised were, rail, cattle, and mules. At

³² Shepherd, op. cit., p. 13.

Ste. Madeleine alone, the Company maintained over 2,000 head of stock (Table 38) for carting and providing manure.

TABLE 38

UNITS OF LIVESTOCK AT STE. MADELEINE

30th, June, 1926

Horses	78
Mules	580
Oxen	322
Cows	422
Calves	351
Steers	138
Heifers	162
Bulls	36
Others	89
Total	2,178

Animals were an expensive means of haulage and many were lost in the various operational processes, though expenses were often offset by the sale of an old animal for beef or the skins. The estate traces were mere earth constructions which became impassable during wet weather. In the exceptionally wet 'dry' season of 1927 for example, 30,000 tons of cane remained unrealed owing to the impassable condition of the traces.³³ Many farmer's canes which had been cut or burnt, and ready for transportation were left to rot in the field, especially after juice fermentation set in. No statistics

³³Ibid., p. 14.

are readily available on canes annually lost by fermentation, but field-factory relationships were usually effective enough to avoid this waste. The history of the railway as a method of cane transportation in Trinidad is mysterious, and, to the layman, unexplainable. Government railway lines were established in the late nineteenth century for the purposes of passenger transportation, and supposedly for the transportation of freight, chiefly sugar from the south to the port of Port-of-Spain. In actual fact however, the only railway lines into the chief cane growing district of Naparima, by passed San Fernando, with main feeder line into Princes Town (Map 7). It was difficult for one railway to properly serve the needs of the sugar growing areas, hence companies were forced to construct feeder railways and roads to ease their transportation problems. These private rails and roads ensured a continuous supply of canes to the factories, while the publicly owned railways and roads served as the transportation means to the export ports. Sugar was therefore transported chiefly by road to the various shipping ports at San-Fernando and Port-of-Spain and little use was made of the Government railway by the sugar concerns. Most estates, both in south and Central Trinidad maintained some railway for field transportation. These lines were laid over a period of time, and in the areas where sugar cane cultivation was most wide spread.

Usine Ste. Madeleine in 1930 had 80 miles of standard gauge (four feet by four and one half inches) and ten miles of two feet six inches guage railway, supplemented by the

Government Railway, in areas near the western coast.³⁴ Some sugar was taken to Port-of-Spain by rail, and transferred by lighters to ocean going steamers in the harbour.³⁵ Harbour improvements after 1930 eliminated the use of lighters and permitted direct on-loading to ships. Most of the sugar however, was transported by road and water to the ships.

Usine Ste. Madeleine has been used as an example to illustrate the type of cultivation and manufacturing activity that was being practised on all estates. On the regional scale every estate had its own peculiar problems determined by a number of factors. These included the availability of capital, soil types and associated factors of cultivation and their effect on transportation, and the nearness to shipping facilities. Up to about 1926, there was the problem of frog-hopper blight and the estates' attempts to find suitable immune varieties, resulting in different cane varieties on different estates, as determined by soil and climate. Generally however, cultivation and manufacturing practises were common to all estates on the territorial scale, and they had similar problems to contend with.

³⁴Ibid., p. 10.

³⁵West Indies Sugar Commission, op. cit., p. 108.

CHAPTER SIX

POLITICS AND SUGAR EXPANSION TO 1938: SUMMARY AND CONCLUSIONS

The history of commercial sugar cane agriculture in Trinidad up to 1838 was determined to a large extent by the politico-economic expediencies of the administering country, Great Britain. The emancipation of the slaves in 1838 and resulting measures of importing labour from Asia, were the first major political steps which helped to determine what course the development of sugar products in Trinidad was to take. The effects of the Crown Colony system and Great Britain's alliance with the large Trinidad proprietors, effectively precluded any other form of agriculture but sugar cane growing on the large plantation system.

The free trade policies of Great Britain after 1865 resulted in the closure of many small sugar estates in Trinidad, since the small proprietor could now no longer effectively compete with beet sugar on the world market. The situation grew worse until the almost total collapse of the West Indian sugar market in 1897 forced the governing country once again to establish some system of preferences for West Indian sugar.

The abolition of bounties in 1903 was immediately offset by the loss of the American market which had been available to the Trinidad exporters, but Canada opened her trading

doors and the sugar exporters found temporary relief. This temporary market of sugar exports to Canada lasted to about 1930, when a system of preferences, bounties, protective duties and rebates on an international scale, made the contributions of the West Indian sugar almost insignificant.

It can be shown that it was largely politics, more so than inefficient cultivation and manufacturing techniques which placed Trinidad in a vulnerable position in 1930, but which, at the same time stimulated producers to introduce improved techniques.

The similarity of circumstances which existed in the sugar industry in Trinidad and the rest of the West Indies in 1897 and 1930, is exemplified by the opening sentences of the summary of the conclusions of the Royal Commission Report of 1897.

'The sugar industry in the West Indies is in danger of great reduction which, in some colonies, may be equivalent, or almost equivalent to extinction.'

The Report of 1930 reads,

'The depression of the industry is due to the competition of other sugar producing countries and in a special degree to the competition of beet sugar produced under a system of bounties.'

In February 1901,¹ the Belgian Government proposed an international conference to discuss the whole question of the bounty system. The proposal was accepted and in December 1901 delegates of all the powers concerned, except Russia,

¹Sugar Commission, op. cit., p. 37-38.

met in Paris. The question of total abolition of bounties depended on Britain actions. Since she was the main market for bounty fed European sugar, England could impose countervailing duties on beet sugar to protect her West Indian market, or to continue her free trade policy to the detriment of West Indian sugar.

At the conference, an implied threat by Britain to impose countervailing duties, resulted in the removal of bounties on September 1st, 1903, and a five year agreement was signed at Brussels on March 2nd, 1902. The powers agreed, 'to suppress the direct and indirect bounties which might benefit the production or export of sugar and not to establish duties of this kind during the whole duration of the convention.'² After the signing of the treaty, West Indian hopes for a bright sugar future soared. However, the cessation of bounties had no miraculous effect on the British West Indies sugar industry. The beet sugar industry was too well established to be seriously affected by the removal of the bounties, and beet sugar manufacturers retained their overseas market by prohibitive duties at home to keep down consumption, by cheap steamship freight charges, and by increased technical efficiency.³

The 1903 cessation of duties was immediately counter-

²Quote from Beachey, op. cit., p. 168.

³Ibid., p. 172.

balanced by the United States cessation of countervailing duties, and cane and beet sugar competed on equal terms on the U. S. market. Cuba was allowed a preference of 20% so that for the British West Indies in general, and Trinidad in particular, the United States market was ended. There was still only a limited market for West Indies sugar in the United Kingdom selling at eight pounds sterling per ton. In 1905 the beet crop failed in Europe owing to an unusually short growing season and prices for West Indies sugar shot up to sixteen pounds sterling per ton. In 1906 however, prices returned to normal.

The saving feature of the British West Indies in the decade following the removal of bounties was the growth of the Canadian market.⁴ Since 1891 Canada had made proposals to accept a low quality West Indies sugar for refining purposes, at a 25% tariff reduction. These proposals came to nought after the West Indies Committee backed down, fearing that prohibitive duties on British West Indies sugar entering the United States would result.

By 1898 the unreliability of the United States market was apparent and again Canada expressed sympathy with the West Indies situation. Agreements were reached and in 1898 Canada admitted British West Indies sugar at a preferential rate of 25% below existing duties. This was raised to 33½% in 1900.⁵ In 1903, when the United States counter-

⁴Ibid., p. 172.

⁵Ibid., p. 173.

vailing duties against bounty sugar ended, Canada placed a 33 $\frac{1}{2}$ % surtax on German sugar imports.

The refining industry in Canada was expanding with the aid of West Indies sugar and refineries were established at Halifax, Quebec and Montreal. A long standing trade between the Canadian Maritimes and the Caribbean Leeward islands was now extended to the other islands and British Guiana. The establishment of the branches of the Bank of Nova Scotia in the West Indies at the turn of the century also facilitated trade relations.⁶ Canada remained practically the only large market available to the sugar colonies as shown by the rise of imports of British West Indies sugar into Canada from 11,000 tons in 1897 to 133,000 tons in 1909.

Since 1897, West Indies sugar producers' pleas were not so much for tariff protection or preferences, but for the establishment of conditions which would eliminate subsidized competition and help to stabilise prices.⁷ They continually pointed out that West Indies sugar would not only survive if subsidies were eliminated, but would cost less to produce than other Commonwealth countries, with the possible exception of India. European beet growing countries refused to eliminate these subsidies. They retained subsidies to encourage the spread of beet cultivation in Europe so that in times of war, they would have an assured sugar supply, and not have to depend on tropical countries for their sugar.

⁶Ibid., p. 174.

⁷Sugar Commission, 1930, op. cit., p. 18.

It was therefore a strategic move calculated to safeguard each European country.

Up to the outbreak of war in 1914, sugar was produced from cane and beet in almost similar proportions (1913-14, 54.7% cane and 45.3% beet). But since the greatest amount of beet sugar was produced in Europe, production of beet sugar fell during the war years to almost one third of what it was in 1913-14. The consequently enhanced price of sugar stimulated the production of cane sugar so that by 1919-20, 79% of the world supply was cane sugar and 20.1% beet sugar.

The first contributing factor to the general slump of 1930 was the comparatively rapid return of beet sugar output to a level similar to that of 1913-14; during the period 1919-20 to 1924-25, the yearly world production of beet sugar increased from 3,326,000 metric tons to 8,316,000 metric tons.⁸ This increase was stimulated and maintained by protective duties, bounties, rebates and other special advantages in most sugar beet growing countries. During 1923-29, there had accumulated an unmarketed surplus of about $3\frac{1}{2}$ million tons of sugar held in various parts of the world. The Sugar Commission of 1930 reported that stocks of sugar in Europe, United States and Cuba on January 1st, 1929, amounted to 5,218,000 tons, an increase of 1,181,000 tons over stocks at the same time in the previous year.⁹

⁸ Sugar Commission 1930, op. cit., p. 30.

⁹ Ibid., p. 10.

In the 12 months ending December 31st, 1929, there were placed on the world markets 28,200,000 tons of sugar, when the consumption was 'a trifle under 27,000,000 tons',¹⁰ and this surplus helped in lowering the price of cane sugar on the international scene.

The second contributing factor was the tariff protection afforded a number of cane growing countries, enabling these countries to sell their product at a remunerative price in a protected market far above the free market price.¹¹ The Sugar Commission of 1930 shows that the normal increase in world consumption had been shown over a number of years to be $4\frac{1}{2}\%$, which in a period of five years, represented an increase in the rate of about 100:125. The ratio of increase in production of cane sugar in protected markets for the 5 years 1919-24 compared with the 5 years 1924-29 was.¹²

Australia	100:179	
Puerto Rico	100:148	
Hawaii	100:144	Average of sugar admitted free
Phillipines	100:199	to United States Market 100:158

Cuba, which was the world's largest sugar producing country by 1930, enjoyed a preference in the United States market but not equal to the full duty. Cuban Government action in 1926-28 restricted its output, and the Cuban ratio for the years mentioned was only 100:122. But the expectable surplus was placed on the free markets of the world, increasing

¹⁰Ibid.

¹¹Ibid., p. 30.

¹²Ibid.

the ratio to 100:157, and helping in the lowering of world sugar prices.

The third contributing factor to the 1930 depression was the improvement within the cane-sugar industry, both in the yields of sugar per acre and in the processes of extracting sugar from the canes. This led to increases in production in such countries as San Domingo, Haiti and Java where the ratio of crops for the 5 years 1919-24 to the 5 years 1924-29 was:

San Domingo and Haiti 100:184

Java 100:144

The cumulative effect of over-production was estimated in the following table prepared by Dr. Mikusch of the Sugar Commission of 1930.¹³

Years	Production	Statistical Consump- tion: (In metric tons & terms of raw sugar	Surplus Prod.
Thousands Omitted			
1923-24	21,390	21,245	145
1924-25	24,883	23,058	1,825
1925-26	26,021	24,542	1,479
1926-27	24,701	24,553	148
1923-24, 1927-28	123,671	119,140	4,531
Consumption not included in sta- tistics (at least 200,000 tons per year)		1,000	1,000
Total	123,671	120,140	3,531

¹³Ibid., p. 31.

The prices of sugar ruling within the several classes of markets on 31st December, 1929:

	Buyer's Price	Tariff Protections	*Residual Price
	s d	s d	s d
(1) Australia	37 4	Importation prohibited	
South Africa	16 0	7 9	8 3
New York	17 6	10 3	7 3
Czechoslovakia	17 0	9 0	8 0
France	15 0	7 0	8 0*
(2) Preferential sugar in London	12 0	3 9	8 3
	c.i.f. U.K.		
Cuban sugar in New York	9 6	2 0	7 0
	c.i.f. N.Y.		
(3) Java sugar in Far East	8 6	-	8 6
	f.o.b. Java		
(4) London open market	8 3	-	8 3
	c.i.f. U.K.		

All figures are reduced to prices per cwt. 96⁰ raw sugar parity.

*i.e., approximately the price in the free markets of the world.

Dr. Mikurch classified the markets available for sugar in four divisions:¹⁴

"The entire trade operates within 4 concentric circles, in which tariff protection exercises its effects in a decreasing proportion from the centre outwards, while freedom of trade proportionately increases.

In the innermost circle is the sugar which is either consumed under the protection of a duty in the country of production or which is consumed in another country where some other form of duty is levied but where sugar is exempt from import duty.

To the next circle belongs the sugar consumed in a country where it enjoys a preference over that of other origin.

In the third circle is the sugar consumed in countries in which it receives no kind of preferential treatment with regard to tariffs or other duties but enjoys a favoured position- which may in some cases almost amount to a monopoly-on account of its geographical situation, freight conditions, marketing, customs or any other circumstances.

Finally, sugar which is really sold in the open market belongs to the outermost circle."

The prices of sugar within these several classes of markets at 31st December, 1929 is shown in the table opposite.

The Situation in Trinidad 1930

The population of Trinidad in 1930 was estimated at 397,000. About 614,086 acres of the island's area of 1,267,236 acres were under cultivation, and of this, 32,874 acres were under sugar cane. (Map 7) It was generally recognised in the West Indies, that the sugar industry was experiencing a severe crisis. The average open market price of sugar in London had fallen from 25sh 9d per cwt. in 1923 and 21sh 9d per cwt in

¹⁴Ibid.

1924 to 9sh 3d per cwt during the first five months of 1929 to 8sh 3d per cwt on Dec. 31st, 1929. The cost of production per cwt of sugar for the British West Indies was 12sh 4½d resulting in a loss of 4sh 1½d for every hundred-weight of British West Indies sugar exported in 1929. Despite the protected market of 3sh 8.8d per cwt the British West Indies enjoyed, the West Indies proprietors were supplying their canes at a loss.

Despite these hardships, the 10 estates in operation in Trinidad were able to continue operations, because of the large capital outlay, organization, and financial backing from their foreign owners. There was the danger however, of the cessation of cultivation of some parts of the estates' lands, but by 1930 this was not yet a reality.

The Sugar Commission of 1930 estimated that 33% of the working population in Trinidad were doomed to suffer if sugar production were abandoned (Table 39) but the recovery after 1930 foiled this possibility. The percentage of the population to be affected by the failure is shown below:

TABLE 39

PERCENT AGRICULTURAL POPULATION EMPLOYED ON SUGAR ESTATES

	Approx. Percentage
Barbados	66
St. Kitts	100
Antigua	100
St. Lucia	25
British Guiana	50
Trinidad	33
Jamaica	10

The figures are significant in that they explain the grim realities which the labouring classes faced at that time, and the still large dependence on sugar as an export commodity and as a major source of territory's revenue.

Most of the estate labourers were Indians living in the old barracks which were "ruinous, decrepit, and full of dirt and vermin".¹⁵ Despite the effective organization of factories for sugar production the social conditions of the labourers always took second place to sugar. It undoubtedly reflected the attitude of the companies, whose chief concern was still that of sugar and profits, at the cheapest possible price. It is surprising to note that despite the poor living conditions reported by the 1897 Sugar Committee, little improvement in living was made by 1930. Peasant cane farmers who were responsible for the construction and maintenance of their own homes, lived in relative comfort, proving that the estate labourer did not live in filth by his own choice. Only recently (since 1950) were real improvements started in housing on estates, and continued present day governmental pressure on the sugar estates, should lead eventually to the final elimination of still existing barracks.

Summary and Conclusions

The development of the cultural landscape of Trinidad appeared to have progressed through three stages of adjustment to the natural conditions.¹⁶ Each of the major sugar cane

¹⁵Ibid.

¹⁶James, P.E., "Some Geographic Relations in Trinidad", Scottish Geographical Magazine, Edinburgh: Vol. XLII, 1926, p. 93.

districts appeared to be at slightly different points in the suggested stages. The first stage which began with Spanish rule of the island, was one of extensive agriculture using the choicest sites in the original area of settlement. This was the case with original cultivation in and around Port-of-Spain.

The second stage which began around 1820 was inaugurated when, under the influence of high prices and cheap land, the crop began to spread to areas less suited to its requirements. High yields were obtained for a time on virgin soils, even with extensive methods of cultivation. The spread to new lands coincided with a period of great prosperity. The sugar industry had spread almost completely over the island, so that in 1836 sugar was reported even for the rainy northern coast which is normally unfavourable to this crop plant.

The third stage of adjustment came at the turn of the twentieth century. This stage covered the period of natural selection where sugar retreated from less favourable areas to those areas best suited by natural conditions. Here production was increased by intensive agriculture, by attention to the understanding and maintenance of soil fertility, by the selection of varieties of cane to suit the varying character of the soil, by the selection of better yielding canes, by more efficient estate organisation, and by many other changes which aided more efficient production.¹⁷

¹⁷Ibid., p. 93.

Despite the historical importance of sugar to Trinidad's economy, the island differed markedly from the other islands of the British West Indies. The first significant difference was the heterogenous nature of the population. For this study the difference is not emphasized except that the French brought ambitious techniques in the early stages and the Indians cultivated sugar cane after emancipation.

Secondly, the long period of Spanish rule in Trinidad precluded the development of a true plantation system of colonisation, since the Spanish were hardly interested in agriculture. The short period of British governmental influence, prior to emancipation, together with the continued problems of the shortage of labour, were mainly responsible for the continued existence of the small proprietor.

Thirdly, the availability of land for squatting by the emancipated slaves and contract free Indians, hastened the development of a peasant farming, which developed before the other Eastern Caribbean islands. This permitted a greater diversification of labour in other agricultural pursuits, such as cocoa and coconuts and provisions often at the expense of sugar cane.

Trinidad, unlike most of the other islands, did not depend on sugar alone to survive agriculturally. Cocoa and coconut estates, as well as the petroleum industry in the twentieth century, offered greater economic and labour diversification, and Trinidad was able to place less reliance on sugar cane monoculture.

But the importance of sugar to the island's economy, especially in the nineteenth century, cannot be underemphasised. Up to 1838, it was the chief crop cultivated simply because the proprietors found it the most profitable commodity to grow. After 1838 however, when the slaves were emancipated, sugar continued as the chief crop because of the introduction of the Crown Colony system of government, and of Britain's influence on the Trinidad planter. Under the Crown Colony system, Britain virtually retained control of legislation, and the island administration was by a governor with nominated executive and legislative councils. In effect, since Britain was still dependent on the West Indies sugar in 1838, legislation permitted and encouraged the expansion of the estate system, and the growth of sugar cane regardless of its social and economic consequences to the island.

The emancipated African and the contract free Indian, were excluded from engaging in this potentially lucrative industry, since they could obtain neither capital nor large portions of land on which to plant canes on an extensive scale. The rise of the peasant cane farmer was a result of the inability of some European proprietors to compete with larger estates, hence their lands were sold to peasant farmers. It was only at the turn of the twentieth century that the importance of the peasant farmer was felt, when he started to supply the factories with canes. By 1930, about 50% of the canes processed by the various factories, were peasant farmers' canes. Britain never did really solve Trinidad's economic

problems. She encouraged a system of sugar monoculture after emancipation, so that the emergence of cocoa was partly a result of local initiative by the Spanish natives, rather than active encouragement from Britain and the landed estate proprietors. The 1897 Royal Commission made it clear not only that Britain had failed to settle the economic problems of Trinidad at the expense of the Trinidad taxpayers, but that Britain could not be expected to do so at the expense of the British taxpayer. The crisis in Trinidad in 1929, brought a similar comment from the Sugar Commission appointed at that time.

Trinidad's survival from 1884 onwards, was a result of the sugar trade with the American government to 1903, and the Canadian government to 1930. Fortunately, by the turn of the twentieth century, cocoa and petroleum offered economic diversification, placing Trinidad in a better economic situation than her island neighbours. Perhaps much is due also to the fact that at this time Trinidad was still the Commonwealth's chief producer of petroleum and asphalt, and the nearest island outpost to the mainland of South America.

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